CONSERVATION

OFFICIAL MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

FRANK GLOVER HEATON, *Editor*

CONTENTS FOR DECEMBER, 1908

THE TWENTY-EIGHTH ANNUAL MEETING..... 640

CONSERVATION WEEK..... 641

THE APPALACHIAN NATIONAL FOREST ASSOCIATION..... 643

THE ATLANTIC DEEPER WATERWAYS ASSOCIATION..... 645

THE MISSISSIPPI-TO-ATLANTIC WATERWAYS ASSOCIATION..... 647

ANNOUNCEMENT OF SECRETARY WILL'S RESIGNATION..... 648

WATER-POWER—By M. O. Leighton..... 649

THE RELATION OF THE U. S. GEOLOGICAL SURVEY TO THE PUBLIC
By George Otis Smith..... 652

REPORT OF THE WATER SUPPLY COMMISSION OF PENNSYLVANIA..... 659

BEARING OF THE PROPOSED APPALACHIAN FOREST ON NAVIGATION
By W J McGee..... 661

PRESERVE THE SOIL—*Poem*—By John A. Joyce..... 663

BOOKS ON FORESTRY..... 664

A BEGINNER IN FORESTRY—*Paper Three*—By Anne Warner..... 665

TREES IN THE PHILIPPINE ISLANDS..... 667

INCREASE IN 1907 LUMBER CUT..... 668

FOREST SCHOOL NOTES—*Illustrated*—

Yale Forest School..... 672
Pennsylvania Forest School..... 674
Colorado School of Forestry..... 675

MOTHER—*Poem*—By Eleanor Van Allen..... 678

ORIGIN OF THE RESERVOIR SYSTEM IN THE UNITED STATES—*Illustrated*—
By Thad C. Pound..... 679

THE FOREST HOLOCAUST—A Symposium..... 687

NEWS AND NOTES—

Forest Service Personnel in Six New Field Districts..... 691
Association Changes Name..... 694
American Mining Congress..... 694
Illinois Votes for Waterway..... 695
Forest Receipts in Western Depositories..... 695
Arboretum for Cornell University..... 696
Resolutions by Carriage Builders' Association.. 696
State Revenues from National Forest Increased. 696

CONSERVATION is the official organ of the American Forestry Association. Price, $2.00 per year, including Annual Membership in the Association. Entered as second-class matter August 1, 1908, at the Post Office at Washington, D. C., under the Act of March 3, 1879

Published Monthly at

1417 G STREET N. W. WASHINGTON, D. C.

THE TWENTY-EIGHTH ANNUAL MEETING

ANNOUNCEMENT was made in the November issue of CONSERVATION of the Anti-Forest Fire Congress to be held in Washington, D. C., January 13-14, 1909. This will be the twenty-eighth annual meeting of the American Forestry Association, and forms an important link in the series of meetings and conferences to be held in Washington during the coming winter. Announcement of a number of these meetings which are to be held in December appear elsewhere in this issue.

Following these important meetings, the Anti-Forest Fire Congress of the American Forestry Association will be notable in many respects. In the first place, it follows a season of disastrous loss from fires in all parts of the country. The congress will be participated in by representatives from all the states which are concerned with forest fires—the losses sustained through them, and their prevention. One of the most important sessions of the congress will be that devoted to the prevention and control of forest fires.

The session which will be devoted to forest reservations will be equally interesting. As the subject of conservation of natural resources has been presented and discussed all over the country, the public mind has turned strongly to the necessity for constant improvement of the National Forests of the West, and to the need for extending the National Forest System to the eastern mountains. Nine out of ten persons, in discussing the conservation movement, say that one of the first steps to be taken is the protection of the Appalachian Mountain Range, north and south.

The session on Forests and Waterways will also be of primary importance. Never before has there been so keen an interest among thinking people of all classes in the relation which exists between mountain and forests and waterways. Indeed, one of the foremost discussions of the year, in engineering papers, has been on this question

The congress will also devote a session, or at least a part of a session, to the subject of Forest Education and Policy. The public is anxiously awaiting each advance of information on the means by which the resources of our country may be made to serve their highest use to the Nation. All of these subjects, and others which will doubtless be included, will make this meeting one of the most important to be held in Washington during this winter. Many popular organizations have already signified their intention to be represented, and many prominent men will be present and speak.

On account of the very important meetings coming early in December, it is thought best not to issue a program in advance of these meetings.

Vol. XIV DECEMBER, 1908 No. 12

"CONSERVATION WEEK"

The Second Meeting of the Governors in Washington, to Receive the Report of the National Conservation Commission

DURING the period from December 1 to December 12, in Washington, occurs the second meeting of the Governors, pursuant to the action taken at the memorable White House Conference held last May. The first full meeting of the National Conservation Commission occurs on December 1, and at this meeting the reports of the four branches of the Commission —Water, Forests, Lands, and Minerals—will be received. During the time which has elapsed since the White House Conference, these four branches have been making an inventory—taking stock, as it were—of the natural resources of the country—their extent value, present condition, promise for future use and development, etc.—and the meetings which begin on December 1 will receive these reports. The reports will be put into shape by the Commission, sitting as a body, and the results of the six months' work will be ready to submit, in proper form, to the Governors, their advisors, and the representatives of the State Conservation Commissions and the commissions selected by the various national associations, at the meetings which begin on December 7.

With less than six months in which to make the inventory, the four branches into which the Commission is divided, aided by the cooperation of the Government departments, have brought together what is probably the most useful collection of facts about the material things on which national industry and progress are based that has ever been assembled at one time.

Reports presenting these facts and pointing out their significance have been prepared. These reports, summarized and indexed, will be submitted to the Commission at its coming meeting.

All through the summer general interest in the work and object of the Conservation Commission has been growing. The public is now well posted on a subject of which only a few specialists had knowledge at the time of the Conference of Governors and experts at the White House, in May.

The Governors carried the spirit of the conference home with them to their own people, and have kept things moving ever since by appointing state commissions to study local problems, by writing and speaking upon the subject of conservation, and by keeping in close and helpful touch with the National Commission. They are ready to take part in the approaching joint meeting.

The bare announcement that it had been set for December 8 resulted in a number of acceptances before the formal invitation of the Commission had even got into the mails.

When the conservation movement was started, specific information about the actual state of our resources was partly wanting, partly inaccessible. Certain facts were broadly known. It was at least unquestionable that our resources had been wastefully used, and that some of them, notably the mines, were sure in time to be completely exhausted, while others—for example, the forests—could still be kept perpetually useful by right management. The first work was to get the facts, to show exactly what the situation was and how it could be improved by measures that would work. Without an inventory of the resources which should show the present condition of resources and the way to develop them to the best advantage, conservation was in danger of staying up in the air.

Plans for the second assembly of the Governors, together with the Governors' advisors and the other representatives making up the whole body, are practically completed. The sessions start with a mass meeting at the Belasco Theater at which President-elect Taft presides. The National Rivers and Harbors Congress and the Southern Commercial Congress, holding their sessions in Washington at the same time, take prominent parts in the program. The meetings during the week of December 1 are to be held in the Senate Reading Room of the Library of Congress, while the place of holding those of the Joint Conservation Conference had not, at the time this was written, been decided upon. These latter sessions will be at 10 a. m. and 2.30 p. m. daily, and it is believed the conference will continue at least three days.

The sessions of the National Conservation Commission, it is announced, will not be open to the general public. The work to be done at these meetings is that of receiving reports from the four divisions of the Commission, and, while it is realized that the discussion of these reports will be exceedingly full of interest, it is also realized that little could be accomplished in the way of putting these reports into shape for consideration at the later meeting, were the public made free of the sessions.

While, of course, not even the semblance of a forecast of the Commission's final report, or any outline of the inventory taken during the past summer, is or can be available until the conclusion of the meetings, it is safe to state that never in the history of the country has so valuable a contribution been made to science and to the general information of the country as is contained in the documents that will be submitted to the Joint Conservation Conference. The January number of CONSERVATION will contain the reports in full of the meetings of the Commission, and the later meetings of the Conference, and this number will, therefore, be of especial interest and value to all members of The American Forestry Association, as well as the members of other conservation organizations and friends of conservation in general.

THE APPALACHIAN NATIONAL FOREST ASSOCIATION

By J. H. Finney, Secretary

TWO matters of great importance to our work are making these "strenuous days" for us and are engaging our utmost activity.

The first of these is the work we are doing and planning in connection with the Southern Commercial Congress, which meets here in Washington, December 7 and 8, during what might be termed "Conservation Week," for following their meeting the Great National Rivers and Harbors Congress assembles for a three-day session on December 9, 10, and 11, while the Governors and their advisers meet again in conference, this time with the National Conservation Commission on December 8 for a two or three day session.

The Southern Commercial Congress promises to mark a new mile-post in Southern affairs and thought. It is to be a gathering of the brains of the South in a program of presentation and interpretation of the South's resources in men and opportunity and material things—topics handled by men best qualified to discuss them intelligently and forcefully on the broadest lines,—not only that the South has these things, but what they should mean to the South, to the Nation, to the world at large.

It is a big conception, rightly planned, as to time and place, and our part in it will not be insignificant, for we are asked to present the Appalachian Forest Question at that time. What we are going to do is to present it right, and, working in cooperation with the Forest Service, we will decorate the small ballroom of the New Willard with a complete exhibit of maps, diagrams, pictures, transparencies, printed matter, etc., and in every way possible enlist the active aid of these men in the fight we are making for National action. We feel that if we can once get the South to see the commercial importance of the Appalachians to it, that we shall arouse in these commercial bodies an aggressive and powerful agency of good.

The other matter is also "worth while," for the Agricultural Committee gives to us on December 9 another hearing on the Appalachian question, this time on Senate Bill 4825, being the bill which passed the Senate last session and which was referred to the House Committee on Agriculture. This hearing is most timely, for we ought to be able to present, through the conservation forces here at that time, the importance of the matter, and the overwhelming sentiment in the matter that the Nation is demanding this piece of legislation and intends to have it! We feel that in no higher or more useful way could these several bodies serve the country, and more effectively further the conservation idea than by getting squarely behind this legislation and making their wishes known in unmistakable terms.

So, in this we are working to get out these influences and effectively using them at the hearing.

Our Association has just sent out suggested resolutions to practically every Board of Trade or Chamber of Commerce in the South, requesting their adoption and early return to us. We have prepared and have mailed a brief review of the Appalachian-White Mountain project, which is quoted below, giving the scope, its present status, and pointing the way to success, to all the leading papers in the South, asking for their editorial comment and cooperation.

We will get it, too, for the South realizes more than ever that it must have the Appalachians and will range itself squarely behind the work we have been doing for its establishment.

The brief review of the project follows:

A BRIEF STATEMENT CONCERNING THE PROPOSED APPALACHIAN-WHITE MOUNTAIN FOREST RESERVE

This project contemplates the purchase by the National Government of forest areas in the Southern Appalachian and White Mountain regions, and their creation into a National Forest under the care and direction of the "Forest Service," on identical lines of management and use as are employed in the existing National Forests in the West, where to-day the Nation has some 168,000,000 acres, to be kept in forest covering perpetually under such wise restrictions as to use as insure their utmost value to the people now and in the future.

While the project has been suggested for a period of twenty years and aggressive agitation has been made for eight or ten years, since the need of Government action has been apparent, it has been along somewhat indefinite lines until the last session of Congress.

At this session, following the exhaustive survey and report of the Secretary of Agriculture there were introduced in the House two bills and in the Senate two bills on identical lines in both branches, all providing for the purchase of 5,000,000 acres in the Southern Appalachians extending from Alabama to Pennsylvania, and 660,000 acres in the White Mountains in New England, and proposed an appropriation of $5,000,000 therefor.

Without going into much detail, no action was taken by the House, the bills dying in the Committee on Agriculture, not being reported out.

In the Senate one of the bills passed, near the close of the session, and being sent to the House, met the same fate as the House bills: viz., "Not reported out of Committee." The result was no action, though the real earnestness, the real urgency of it, the vital concern of the whole Nation in it, were never better or more convincingly shown. See House Document, "Hearing on the Appalachian Bill."

The Senate Bill (No. 4825) being still before the House Committee on Agriculture for their action, must be taken up and disposed of at the coming session of Congress, and if the committee can be induced to report it so that the House can consider and debate it, it stands an excellent chance for enactment into law, for a careful poll of the present House seems to show that the project, which has the cordial endorsement of the whole Nation, will win by a large majority if a vote can be had on it—and that the old device of keeping it buried in committee may not at this session avail to prevent action.

We are not so much concerned with the success of any special measure. We want and must have in some definite form an adequate start toward a National Forest in both sections, so that we plan to support heartily any measure or measures which will best bring this about, as a start toward a definite, systematic and clearly defined forest policy on the part of the Government, the carrying out of which would mean the extension of the National Forests to all sections where they may be "constitutionally" established and "insure national sanity" as regards their proper conservation to the utmost extent possible.

A large impetus has been given to the cause of forest perpetuation along these broad lines by the conservation movement, which had its inspiration in the Governors' Conference in May last. The National Conservation Commission appointed by the President as the result of that conference has been engaged for months in a study of the National resources and of all the questions involved in their wise utilization. Its early report must be an authoritative utterance. If this report fixes the forest question as of first importance because of their rapid destruction and their early complete exhaustion, it will arouse a demand for their preservation that Congress must heed—and this demand must name the Appalachian-White Mountain region, first. Whether the Conservation Commission does this or not, conditions are such as demand that there be no let up in the earnest and hard work of the unselfish men and women of the Nation who are urging National action in this important matter, and legislation bearing on it should continue to receive loyal and earnest support.

The Agricultural Committee of the House proposes to grant a public hearing on the Senate bill on December 9, in Washington. There will be in session in Washington on December 7 and 8, the Southern Commercial Congress, representing the commercial voice of the entire South. There will be in session there on the 8th the Governors and their advisors, in conference with the President and the National Conservation Commission. There will be in session there on the 9th, 10th, and 11th, the great National Rivers and Harbor Congress—and every man in attendance upon them, who is alive to the conservation idea, should be in attendance on this hearing and make his influence felt before the committee.

Furthermore, every civic league, every chamber of commerce or similar body, every woman's club in every Southern city, should, prior to December 9, pass ringing resolutions demanding this legislation and see that the Appalachian National Forest Association in Washington gets them in time to use them at the hearing on December 9.

Do you plan to help?

ATLANTIC DEEPER WATERWAYS ASSOCIATION

THE first annual convention of the Atlantic Deeper Waterways Association was held in Baltimore, November 17 to 19, 1908 a large attendance and intense interest marking the gathering. Representatives were present from all the Atlantic Coast states, as well as from a number of the inland states. The old officers were reelected and strong resolutions were adopted. The resolutions follow in full:

The Atlantic Deeper Waterways Association, at Baltimore, assembled in its first annual convention, November 17 to 19, 1908, after full consideration and discussion of the relation of waterways to domestic commerce, and particularly of the requirements of the commerce of the 30,000,000 Americans living upon the Atlantic seaboard, approves and adopts the following resolutions:

Resolved, That the business interests of the seaboard population directly, and of the entire nation indirectly, require the removal, at the earliest possible moment, of the natural obstructions to a free interior deep water route from Massachusetts Bay to Key West along the lines indicated by existing canals and by surveys already made under the auspices of the Government of the United States.

Resolved, That in the judgment of the members of this association, and of several of the foremost railway experts in the country, the construction of this water highway can alone give gravely necessary and permanent relief to the business of transportation already hampered by insufficient facilities and threatened with more serious obstruction in the early future.

Resolved, That the evidence is conclusive that an interior deep water channel along the coast will be likely to repay even very large cost within a brief period by reducing the charges for the movement of commodities.

Resolved, That the canals should be digged in any case by the Federal Government; first, because the Government alone has authority over navigable water; second, because all the canals should be free, but chiefly because the enterprise, planned in the interest of peace, will have incalculable value for the whole nation in case of war.

Resolved, That in the opinion of this association Congress should deal with this problem as a permanent remunerative national investment, and not as a matter of making annual expenditures, and in view of the need for the earliest relief from the impending congestion of railroad transportation, the money required for deeper waterways should be met by an issue of bonds.

Resolved, That this association warmly commends and asks the continuation and deepening of the waterway from Norfolk to Beaufort Inlet, N. C., now in process of construction under an appropriation and project heretofore adopted by Congress; it asks that Congress shall make the Delaware and Chesapeake Canal the property of the Federal Government and begin its reconstruction in accordance with the recommendation of the Agnus Commission; that surveys shall be made for a canal from Beaufort south and from the Delaware River to New York harbor; that the Hudson River shall be deepened so as to meet in its upper reaches the needs of the traffic upon the improved Erie Canal; and that all necessary promotion shall be given to the projects for opening a channel between Long Island Sound and Massachusetts Bay.

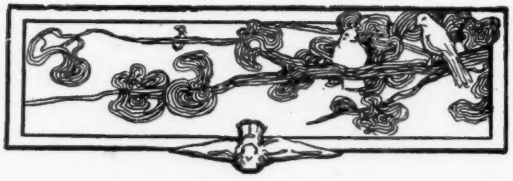
Resolved, That this association pledges itself finally and irrevocably to the Atlantic Deeper Waterways scheme

in its entirety and in detail, preferring no one link in the chain to any other, but ardently desiring that each link shall be dealt with promptly and in accordance with its requirements in its relation to the total undertaking.

Resolved, That notwithstanding this association was organized particularly to promote the construction of a continuous waterway from Maine to Florida, we are in sympathy with all meritorious movements for the improvement of our waterways. A waterway from the Lakes to the Gulf is demanded by the great states composing the Mississippi Valley; and, whenever the engineers shall have recommended a route satisfactory to that section, within reasonable limits of cost, this association stands ready to unite with other sections in promoting legislation favorable to the great waterway. The movements for a waterway connecting the Mississippi with the Atlantic Ocean and the Atlantic with the Gulf, together with other waterway improvements which are shown to be practicable, also have our sympathy and cooperation. This association is committed to a broad, liberal policy consistent with the demands of commerce and within the ability of the Government to construct.

Resolved, That this association extends cordial greetings to the National Rivers and Harbors Congress which will soon convene in the city of Washington. That body has prosecuted a forceful propaganda of education among the people of the country for larger and more regular appropriations for the deepening and improvement of our harbors and waterways. We pledge our sympathy and active support in the continued prosecution of the work of that Congress.

Resolved, That the association approves the work of the United States Forest Service and commends the progressive and efficient administration of this service under the present Chief Forester; and commends the work of the "Inland Waterways Commission" and the other official and individual movements for the conservation of our natural resources. If the normal flow of our navigable streams is to be preserved, if the disastrous results of floods are to be averted, the forests and their floor covering at the headwaters must be preserved under the regulation of intelligent foresters. The interdependence of navigable waters upon their rerelated natural resources is fully recognized and we pledge our efforts for the maintenance of all movements for their conservation.



MISSISSIPPI-TO-ATLANTIC DEEP WATER-WAYS ASSOCIATION

A NOTABLE convention of the month was that of the organization hitherto known as the "Gulf Coast Inland Waterway Association." It was held at Columbus, Ga., November 10-11, and was largely attended by delegates from Louisiana, Mississippi, Alabama, Georgia, and Florida, with members and guests from Illinois, Indiana, Ohio, South Carolina, and the District of Columbia. Notable addresses were made, that by Hon. Duncan U. Fletcher, U. S. Senator-elect from Florida, attracting particular attention as an exposition of the present condition and needs of navigation in the Southern States.

The name of the organization was changed to "The Mississippi and Atlantic Deep Waterways Association," and a committee was appointed to revise the constitution. Senator Fletcher was elected president for the ensuing year, with Mr. Leland J. Henderson, secretary, and Mr. G. A. Waterman, treasurer, with a strong body of vice-presidents and an effective executive committee. The resolutions adopted (apart from those of a more personal character) are as follows:

Feeling that the full industrial development of the southeastern states must depend on improved transportation facilities, we favor the adoption and prompt execution of a comprehensive plan of waterway improvement. We especially favor and call for, as a just right, the construction of a deep inland waterway along the eastern gulf coast to connect the Mississippi River with the Atlantic Ocean, together with the improvement of the gulf slope rivers in such manner as to open new territory to water transportation. We favor the execution of the work under federal appropriations adequate for prompt and certain completion of the entire project; and, in case the state of the public treasury forbids sufficient appropriations at an early date, we favor the issuance of bonds in such an amount as to insure the completion of the work in a businesslike way.

In voicing our needs, we appeal to the Federal Government as of right; and as citizens and as representatives of the citizens of six sovereign states we claim consideration and action by Congress in accordance with the repeated recommendations of the federal administration and the united declaration of the governors of all the states of the Nation.

Resolved, that this convention cordially and unreservedly approves the work of the National Rivers and Harbors Congress, and endorses the policy advocated by it, and that this association take out a membership in the National Rivers and Harbors Congress and send delegates, not exceeding fifty, to the coming convention of said congress in Washington, December 9, 10, and 11, 1908, and urge upon all municipalities and commercial organizations in the states represented in this convention to do likewise.

That this association authorize the president to appoint three members as directors of the National Rivers and Harbors Congress, and ask that these appointees be elected such directors by said congress—one from the Chattahoochee River Basin, one from the east gulf coast, and one from the Atlantic Coast of Florida.

Resolved, that the Mississippi to the Atlantic Inland Waterways Association endorses a comprehensive businesslike system of caring for and improving

rivers and harbors and of extending such natural advantages by means of connecting canals whenever needed or justified by prospective requirements of trade between such natural waters. We specifically approve and endorse the Inland Waterways Commission.

That this convention heartily endorses the national policy of conserving all natural resources, and especially the sources of control of the water supply of inland streams, and to that end advise that the several states of the Union legislate with a view to vesting in the National Government sufficient authority above heads of navigation to adequately protect the rights of posterity as well as the advantages of the present generation.

That this association calls upon the governors of the states who have not named delegates to the approaching meeting of the National Conservation Commission to do so at once, selecting suitable persons who will attend the meeting and represent the states from which appointed; and that the president of this association be requested and urged to attend said meeting of said National Conservation Commission, and the Hon Napoleon B. Broward, governor of Florida, be requested to appoint the president of this association as one of the delegates from the State of Florida.

That we unreservedly endorse the project and purposes of the Southern Commercial Congress, to meet in the City of Washington, December 7 and 8, the purpose of said congress being to bring the South itself into a clearer understanding of its rich possessions and to bring to the North and the rest of the world a fuller and therefore juster appreciation of the resources and opportunities of the South. Said liberations, we urge every resident of Southern States to visit Washington for this and the other great events of the week beginning Monday, December 7.

RESIGNATION OF DR. THOMAS E. WILL

At a meeting of the Executive Committee on October 19 Dr. Thomas E. Will tendered his resignation as Secretary of the American Forestry Association. It was accepted to take effect on October 26.

Although without connection with the Association since October 26, Doctor Will retains a deep interest in Forestry, and articles from his pen may be anticipated from time to time.

WATER-POWER

Our Unappreciated Resource and Our Future Refuge

By M. O. LEIGHTON, Chief Hydrographer, United States Geological Survey

IN THE closing days of August there were featured in the daily press accounts of floods in some southern Appalachian rivers. The descriptions contained nothing new. The story of some earlier flood would have been quite as satisfactory if a few names and figures were changed to correspond with local conditions. The really important facts were, as usual, omitted. To illustrate this, a single instance will be discussed.

Augusta, Ga., is situated on the Savannah River, at the head of navigation and at the foot of a series of falls and rapids that surmount forty-four feet in seven miles. A water-power privilege is thereby afforded, which, if fully developed, would furnish a minimum of about 15,500 horse-powers. Bear in mind that this is the development which, under present conditions, limits the value of the privilege. With an accommodating market, more power might be sold during seasons of high water, but 15,500 horse-powers are all that could be guaranteed throughout the year. In other words, until a greater flow can be secured during low-water seasons the Augusta privilege must be classed as 15,500 horse-power.

Newspaper reports fixed the damage of the August flood at Augusta at about $500,000. For present purposes it matters not whether the proper figure be one-half or twice the newspaper estimate. The items of damage included loss to real property, raw materials, and finished merchandise, machinery and other equipment necessary to manufacturing and commerce. Possibly the estimate included losses due to interruption of traffic, delay in production cessation of wages, and other circumstances consequential in nature. It is unlikely that the estimate included depreciation of property values, arising from the menace and uncertainty of future recurrent floods, though this is often a larger item of flood damage than all those above cited. Finally, it is certain that the estimate did not include the most serious loss of all: *The loss of the flood water.* It swept by Augusta unrestrained, carrying with it far more astonishing possibilities of ultimate benefit than can be measured by the devastation resulting from its unrestraint. For the purpose of measuring this most serious loss, let us scale is off in terms of water-power.

During the August flood there passed by and through the city of Augusta approximately 62,000,000,000 cubic feet of water in five days. If the water so lost had been conserved in forests and reservoirs on the upper drainage area of the Savannah and released uniformly throughout, say, the six low-water months of the year, the flow past Augusta would have been increased during these months by about 4,000 cubic feet per second. We know from observation of flow in the Savannah, that the remaining six months of the year will furnish at least as much as this, in addition to the usual low-water flow. Now this amount of water, falling over the forty-four feet at Augusta, will produce 14,500 horse-powers. All this assumes a condition under which the entire flood could have been stored. But we know that all could not have been stored. With proper conditions of forestation, and with available reservoir sites utilized, about sixty-five per cent. of this flood could have been withheld. Therefore, we must reduce the power above given by the same proportion. The final re-

sult is, therefore 9,500 horse-powers, which, added to the previously stated minimum power, would raise the rating of the Augusta privilege from 15,500 to 25,000 horse-powers.

Seventy dollars per horse-power is not a large installation cost in this country. Some developments in the region have cost far more than this. Therefore, the value of the Augusta privilege alone, on the basis of the August flood, would have been increased $665 000 by the adoption of proper means for saving the flood water. This is the figure which represents the principal item of loss in the Augusta flood, and of which neither the press nor the world made record.

The Augusta case has been discussed because its application is so thoroughly general. Like consideration apply to all water-powers. We have in the first place, an amount of economically available water-power, enormous in the total for the country, with rivers in their present condition of unrestraint. Secondly, we have a reserve which may be made available by means which will save the flood waters now wasted. No consideration of water-power is complete unless it comprehends the double possession. The extent of our suffering from floods must, therefore, be an index of our wastefulness of water-power. This may be accepted as fundamental.

We, as a Nation, present the curious appearance of being highly progressive on the one hand, and ruinously extravagant on the other. We get what we want, but the price that we pay is exorbitant. At the present time we are using not less than 26,000,000 steam horse-powers for manufacturing, light traction, etc. It is true that there was a time when steam was the cheapest and most adaptable motive power. That day is past, or is rapidly passing, for everything except marine locomotion, and the twilight of that is not far distant. Steam-power is comparatively expensive, yet steam installation is constantly increasing. We persist in using expensive motive power, while millions of horse-powers are going to waste in our rivers. The steam-power plants of the country must use approximately 260,000,000 tons of coal per year, an amount considerably more than one-half our total consumption of coal for 1907. Therefore, not only are we paying more than is necessary for our motive power, but we are in the process of making great and greater demands on our coal resources, to hasten their ultimate exhaustion.

It will be well now to consider how much cheaper is water-power than steam-power. Of course, there is a wide variation depending on many factors, most important of which is the price of coal. There are places in which coal is so cheap that the cost of steam-power exceeds little, if any, the cost of water-power. In other places, the difference in favor of water-power may exceed $60 per horse-power. The State Water Supply Commission of New York, working under the guidance of one of our most competent engineers, calculated that in that state a steam horse-power per year is $12 more costly than a water horse-power. This may be considered a small margin, resulting partly, no doubt, from the proximity of New York State to the Pennsylvania coal fields. Therefore, we shall be exceedingly conservative if we use this factor for the entire country.

As previously stated, there are in use 26,000,000 steam horse-powers. Undoubtedly there is some of this so situated that it could not at present, be replaced by hydro-electric power. If ten per cent. be allowed for this we shall be making a very liberal concession. This leaves 23,400,000 steam horse-powers which, at an excess cost of $12 per horse-power, gives a total of about $281,000,000, which the people of the United States pay annually for the privilege of squandering their coal resources. In view of this conservative estimate, is it not remarkable that we do not use more water-power?

Whether or not the people awaken to the bountiful water resources of the country, it is inevitable that the progressive exhaustion of our coal depos-

its, and the consequent increase in the price of fuel, will drive us to water-power. It is, therefore, proper to ask whether or not the water resources of the country are sufficient to meet future demands. It is recognized that the demand for power must have future increase, even greater than that of the past. Therefore, let no one underestimate the task of providing a substitute for steam. Notwithstanding this, the prospect to one who has looked broadly into the country's water-power resources, is altogether pleasing. No one can tell at present just how extensive are those resources; although, in a few months, approximate figures will be at hand. Yet if we estimate from information now available, there is a wealth of conservation in the statement that 50,000,000 horse-powers may be produced from our rivers. Nor would there be any surprise on the part of the author if the final surveys show that with maximum conservation, three times the above amount may be realized. In any event the demands of a goodly number of generations will be amply served.

Our duty to ourselves and to posterity in the stewardship of our natural resources is not ended with the accomplishment of great achievements. Because we may, by wise procedure, ensure unto the fifth or sixth generation an abundant supply of this or that necessity, the obligations imposed by our stewardship are in no wise satisfied. Yet if, by conserving all water-power that can be made available on demand, we can look ahead to a sufficiency for that fifth or sixth generation, we shall have accomplished a duty manfully and well. Having done all that we can, our responsibility, at any rate, will have been discharged. It will not suffice merely to know that the United States affords 50,000,000 or 150,000,000 water horse-powers. Like riches, horse-powers have wings. Present possession provides no guaranty of future availability. Our duty lies in securing those horse-powers, using what we need and placing the remainder in safe deposit. Thus would a private corporation do. Why, then, should not a public corporation do likewise? The same economic principle controls both.

Present practices, all too familiar, will finally so dissipate our water-power resources that they will not be sufficient even for present demands. Therefore, the precept is utterly convincing that the first duty of the people is to study these resources and provide corrective measures for those practices. Thus shall we not only achieve power in more than one sense, but we shall consequentially provide for all other lines of water utilization and conserve our most valuable mineral deposits. There is but one great problem involved; to break it into parts, to pursue one object to the disregard of another merely betrays a narrow and obsolete view-point. Water-power is but one factor, although the most important, in a vital and world-wide problem, the solution of which has fallen to us. So far our shirking has been ingenious. The process has been easy, but even now we are paying the price.

THE RELATION OF THE UNITED STATES GEOLOGICAL SURVEY TO THE PUBLIC*

By GEORGE OTIS SMITH, Director U. S. Geological Survey

TO SERVE the people is the purpose of every Government department and bureau. As a part of the public service the Geological Survey has functions prescribed by law. In the organic act establishing this bureau twenty-nine years ago it is specified that the Director of the Geological Survey shall be charged with the classification of the public lands and the examination of the geologic structure, mineral resources and products of the national domain. Thus did Congress express its recognition of the practical relationship existing between geology and the mineral industry as well as its appreciation of the fact that these mineral resources constitute the Nation's material wealth.

The Survey thus became a pioneer agency in the development of the country. Its name expresses the scope and character of its work as national scientific, and practical. "Survey" stands for work in the field, and this branch of the public service is an organization for practical investigation in which the methods of pure science are made to serve utilitarian ends so as to insure the attainment of the economic results desired by the public. To be successful a Government scientific bureau must be practical.

The extent of the operations of the Survey depends upon the size of the annual appropriations in its behalf. Congress has gradually increased these from $100,000 to more than one and a half million, so that the Geological Survey has from year to year become better equipped to occupy the large field of public service to which it was given a title in 1879.

Its activities are all directed toward the public benefit, but are so varied as to deserve a simple classification for purposes of description. The exploration work of the Survey includes the discovery and mapping of the previously unknown; the investigations by the Survey have as their purpose the determination of the value of all the new data collected by the fieldmen; and the publication side of the work involves the making known to the world the results of these explorations and investigations.

As I speak of the explorations of the Survey, I must mention first the twenty-five to thirty thousand square miles of territory that is mapped each year by the Survey topographers. Exploration is the correct term, for our topographic surveys bring out new discoveries even in portions of the United States long settled. For example, the highest points in such old states as Ohio and Pennsylvania have been determined only recently in the course of the field surveys of these areas by our topographers.

The detailed maps that are being thus made of the country already number 1,800 sheets, which together cover one-third of the area of the United States. These maps constitute the "mother map" of the country in that they are based upon actual surveys, so that the other maps with which the public is familiar, whether published in geography, atlas, or as a folded state or county map, are to a large extent based upon the United States Geological Survey maps.

These topographic maps are utilized not only by the map-makers who sell their publications, but by the Govern-

*Address delivered before the Maine State Board of Trade, September 22, 1908.

ment cartographers, for example, in making the Post Route maps of the Post-office Department, or as bases for the military maps prepared by the War Department. While we know the extent to which the maps are put to a federal use, we can only estimate how largely they are utilized by the engineer in private practice in the great industrial enterprises of the day

These maps now possess a degree of accuracy which fits them to serve the general purposes of preliminary surveys, so that the engineer can use them for the location of railroads, canals, highways, trolley lines, or in connection with planning water supply, sewerage, drainage, or irrigation systems. The fact that the sales of these Survey maps average over a thousand sheets every day in the year is evidence of a popular demand, but the measure of the contribution of these surveys to the public includes more than the extent of map distribution. Over all parts of the country there have been lines of levels run amounting to more than 200,000 miles, over 8,000 miles being run last year. Permanent bench marks are established, 2 100 last year, as a result of this accurate leveling, and these monuments serve the public, whether it be the western ranchers planning their irrigation system or the eastern engineers selecting a pipeline route.

Geologic mapping by the Survey geologists is another branch of exploration work, in which not only is the surface distribution of the rocks and soils observed and mapped, but also the subjacent formations are studied, to the end that the published maps may furnish the prospector, the mine-operator, or the driller for oil, gas, or water with reliable information as to what may be encountered at hundreds and thousands of feet beneath the surface. Detailed geologic maps covering thousands of square miles are issued each year, and the issue of such a map of a mining district is eagerly awaited by the mining engineers and mine-owners.

Nowhere has the Survey made a better record than in Alaska. Exploration work in this northern outpost of our country has resulted in maps that have well served the purposes of the prospectors and miners who have added so much to the Nation's wealth. The literature on Alaska of value to mining men is almost wholly of Survey authorship; yet the explorations represented by these reports and maps have involved an expenditure of less than half a million dollars or only one-half of one per cent. of the gold output of Alaska for the same period, not to mention the increasing production of coal and copper. Few taxes are so light as this.

The investigation work of the Survey is closely connected with the explorations by the field-men. The data collected must be studied, whether these are geologic, geographic hydrographic, or technologic: that is, whether they concern, for instance, ore deposits, mountain passes, waterfalls, or smoke abatement. Many are the lines of investigation, and each in its final analysis is found to be utilitarian.

One of the most important investigations under the Geological Survey is that of the water resources of the country. The daily flow of streams has been gaged at over 1,500 points throughout the United States for a period of years, and from these records the public can gain the most authoritative information available regarding the average flow of these rivers. During the past year 630 gaging stations were maintained.

Still another line of activity in scientific investigation by the Geological Survey is its technologic work. The testing of the fuels and structural materials, of which the Government itself is so large a consumer, has inaugurated investigations which have already yielded results of the greatest value to the public. Time permits mention only of the general scope of this work, but this is sufficient to indicate its importance. These investigations include the gas-producer tests which have shown the practicability of utilizing for power generation low-grade fuels, such as slack coal, bone, and lignite; the

manufacture of briquetts, so commonly used in foreign countries, and the testing of these briquetts on locomotives and naval vessels; comparative tests of the producer-gas engine with the steam engine and of the internal-combustion engine using gasoline and kerosene as well as alcohol; coking and washing tests which demonstrate the coking possibilities of many of the Rocky Mountain coals heretofore regarded as non-coking; smoke abatement investigations which have indicated the conditions in steam boiler practice necessary for securing more perfect combustion; inquiries into the available supplies of concrete materials and the study of these constituent materials; the investigation of concrete as a structural material for different purposes and under different conditions with tests of concrete beams of different ages; comparative tests of different materials to determine their fine resisting qualities and strength at different temperatures; all these investigations have been carried forward and results of the most practical kind secured. Over 1,000 inspection analyses have been made of coal purchased by the Government on specifications, resulting in the delivery of coal up to the fixed standard of purity. This method, just inaugurated in the Government service, of getting the coal it pays for and of paying for just what it gets, is worthy of imitation by the general public. In a similar way all these technologic investigations, while made by the Survey primarily for the benefit of the Government, are in reality of even greater value to the public at large. Another line of investigation has as its purpose the prevention of mine disasters, with the consequent appalling loss of human life. Experimental work in the testing of explosives has just begun at Pittsburg under the supervision of the Survey.

The explorations and investigations of the Survey realize their full purpose only as the results attained are published. The relation of the Survey to the public demands that these results must be presented in the form best adapted to secure publicity and that the publications must be distributed with care and expedition. Thus the Survey becomes a bureau of publication as well as of investigation, and here lies the real test of its success in the service of the people.

Publicity of results is secured by the preparation, publication, and distribution of the reports of the various investigations, geologic, geographic, hydrographic, and technologic, by the engraving and printing of the maps representing the surveys, and by the distribution of news bulletins issued weekly for use by the newspapers of the country. This news service deserves a further word inasmuch as it represents the Survey's point of direct contact with the most efficient agency of publicity, the newspaper. Advance notices of Survey publications, summaries of reports of special interest, preliminary statements of the statistics of mineral production, and news items regarding work in progress in the different branches of the Survey constitute the subject-matter of these press bulletins. Their purpose is to acquaint the public with the activities of the Bureau and to advertise the reports as issued, that the public may secure promptly the results of the work that is supported by public money. In this press-bulletin service there is no intention of advertising any one connected with the Survey, nor of creating public sentiment, nor of influencing public opinion, except as public opinion may be molded by the facts presented in the reports published by the Survey. In short not only must the scientific economic investigations of the Survey be made to yield authoritative results, but these results must be given to the public. Whatever form of publication secures the greatest publicity without affecting the integrity of the statement of these results, that form best serves the public.

In the publication branch of the Survey, there were issued in the fiscal year just closed: 127 books, comprising over 10,000 pages, nine geologic folios, eighty-seven new topographic maps,

127 reprints of maps, and fifteen special maps—a separate publication for every day of the year, with a grand total of copies issued of over 900,000. The total distribution of these publications was nearly 850,000 copies.

After this review of the different phases of the work of the United States Geological Survey, it may be appropriate to speak of the policy governing this branch of the public service. I have said that the Survey had its origin in an appreciation of the importance to the Nation of its mineral resources. In 1879, the treasure house of the country had barely been opened; the value of last year's mineral output was approximately six times that of the product of 1880.

This phenomenal growth of the mineral industry during the life of the Survey has emphasized the industrial dependence of the country upon its mineral wealth, and the present year has seen a nation awakening to a realization of its future needs. Thus it is that the Survey's duty to the people has caused its role to change in these thirty years from that of the promoter of the development of the mineral industry to that of the conserver of these sources of wealth. The Nation, under the lead of President Roosevelt, has begun to take thought of the morrow, and it has turned to its scientific bureaus for authoritative information.

The problem before the American people to-day is the extension of the life of its natural resources. It is fortunate that the explorations and investigations of the Geological Survey not only have contributed to the development of these resources, but also have furnished quantitative data that are available at this time of popular awakening to the needs of national conservation. The practical value of the Survey's scientific work has thus won popular recognition and appreciation, so that the Bureau can realize more fully its purpose of promoting the economic development of the country along proper lines.

Conservation as applied to mineral resources means the meeting of present-day needs with an eye open to the requirements of the morrow. To this end, an inventory of the country's present supply of the essential materials is the first step, and for a period of years the Survey has been engaged in stock taking. The Survey geologist has measured the coal and iron reserves; the Survey hydrographer has gaged the streams of the country, determining their flow and calculating the available power; the Survey topographer has explored and mapped the little-known areas, furnishing us with reliable data from which may be determined the feasibility of reclamation by irrigation or by drainage, and the Survey statistician has determined and recorded the increasing rate of production and consumption of mineral products. With this information already at hand, the greatest incentive to economy is provided. The phenomenal industrial growth of the past few years cannot continue without endangering the future unless wasteful methods are stopped.

The campaign of conservation must be one of education. In this educational service, the Geological Survey, like the other scientific bureaus, long since enlisted. Its policy has been to better economic conditions by the investigation of the Nation's natural resources. Through such investigations by the Geological Survey the Forest Service and the Reclamation Service both originated, the older bureau by its preliminary work marking out the great fields open for the larger activities of the younger organizations. In the subjects other than forestry and irrigation, the Survey has continued its work and to-day is presenting to the public facts that constitute most forcible arguments for national conservation.

The subject of our mineral fuels is one of intense interest to the American who desires his country's future to be no less brilliant than its present. On the eve of the Governors' Conference at the White House, the Survey issued a map of the coal fields of the United States. This showed both graphically and sta-

tistically the extent of the Nation's coal reserves; but great as are these stores of fuel, at the present rate of increase in consumption, these statistics indicate that the supply of easily mined coal will be exhausted before the middle of the next century. Cheap coal has given this country its industrial supremacy, and it is well to take this account of stock.

The very abundance of our mineral fuels and ores of the important metals has discouraged economy, so that the problem immediately before us is that of waste prevention. Nowhere are the present conditions more critical than in the case of coal. At every stage in the mining and utilization of coal there is waste to an extent almost beyond belief, and much of the technologic investigation on the part of the Survey is directed toward lessening the waste in the production of coal and increasing the efficiency in its consumption.

Water is unquestionably our greatest mineral resource. All great industries —agriculture, manufactures, transportation, and mining—depend upon it, and it is fortunate indeed that our President has called the Nation's attention to the value of its water resources. The possibilities of our rivers and streams well deserve the investigation I mentioned earlier as being carried on by the Survey. Flood prevention would save to the Nation over $100,000,000 annually, and it is believed that flood control could be secured by an expenditure equivalent to the present losses from the floods of a few years. Inland water navigation is demanded to solve the present-day problems of interstate commerce. Reclamation by irrigation and drainage means the winning to the use of man of vast tracts of fertile land and thus increasing the national wealth. Even more opportune to-day is the discussion of the utilization of our water power. While America is the greatest consumer of coal, more than one-half of the present consumption in the United States has for its object the generation of power. In the presence of enormous undeveloped water powers, this drain upon the coal resources seems in a large part unwarranted. Utilize this water power and there will result not only the financial saving of to-day, but also the conservation of the coal. Nor should we think that posterity alone is concerned in this conservation of our resources. Every step toward the exhaustion of our easily mined coal, for instance, will be marked by a rise in price.

It is, then, only by systematic study of the natural resources of the country that progress can be made toward national conservation. The practical value of the Survey's scientific work has been recognized in this connection and the usefulness of its results appreciated by the general public. With reliable information before us regarding our stores of natural wealth, our present wasteful practices, and our possibilities of improvement in methods of utilization, there should indeed be sufficient incentive to join in the movement for national betterment.

As a citizen of Maine, addressing a representative body of Maine men, I should speak of the share our state has in this national conservation. In all that relates to natural resources, political boundaries play little part. Most of the important rivers of the country are interstate streams. The distribution of the forests and deposits of valuable minerals antedated by centuries and ages the definition of state boundaries. Thus the paper manufactured from timber from the Maine forest by power derived from one of our rivers may go to a southern city, or again, the steel used by one of our Maine mills may be the product of a Pennsylvania furnace using Minnesota ore, West Virginia coke, and New Jersey limestone. It is this interdependence, this community of interest, that makes anything that affects any part of the country a matter of real concern to the citizens of Maine. Yet there are certain phases of this broad subject that touch us more intimately than others.

The farm, forests, and water powers of Maine comprise her chief natural wealth and constitute the real basis for her industrial life. Of these I will men-

tion only two, the forests and the water resources, which indeed cannot easily be discussed separately.

The rivers of Maine now contribute to the industries of the state a total of 341,976 horse-power. It is estimated that, fully developed, Maine's water powers might yield with proper storage somewhat more than 1,000,000 horse-power. This conservative estimate gives our state the equivalent as regards power generation, of the coal production of several of the fairly important coal states.

The development of these water powers is the line for Maine's future industrial progress. The preservation of this source of cheap power is a trust which we of to-day must acknowledge, and waste of this natural resource is criminal, inasmuch as with proper care water power can be utilized to the fullest extent and at the same time be successfully conserved for use by posterity. The discussion of the conservation of our water resources leads directly to the consideration of our forests.

Full appreciation of Maine's dependence upon her forests and exact knowledge of the extent and present condition of this resource are essential if we are to seek to inspire the people to adopt a policy of economy. There must be an educated and aroused public opinion if waste is to be discouraged. First of all, we must not be led by sentiment, but rather be urged onward by practical knowledge. Waste may or may not find some excuse for existence. There is a theoretical waste which it is not practicable to avoid under present conditions, but there is also waste against which both theory and practice warn us. There are the tops and limbs that cannot be taken from the forest, because their utilization would cost more than it could yield; but there are many forms of waste which may be avoided with profit to all concerned. Chief among these is the annual loss by forest fires. Two well-qualified speakers are to address you on this subject, and will discuss the prevention of this form of waste.

After several years of field work in the states of Michigan and Washington, where I have traversed hundreds, if not thousands, of square miles of territory devastated by forest fires, I feel qualified to add my warning as to the consequences that follow close upon such devastation. The forest is not only of value for the timber it contains, but it is the great conserver of soil and water. We might do without wood, but we cannot do without the forest. The soil that formed under the protection of the forest cover is soon washed away after the forest fire, if indeed the best of the soil was not reduced to ashes along with the forest itself. The streams that had their sources in the forested hills become seasonal torrents after the fire and the burnt-over land is indeed a thirsty land. No caliper surveys, however carefully made, of the burnt-over tract can furnish an estimate of the actual loss to either the owners or the people at large. The land at best has been made non-productive for a long term of years, and if the acreage is large the industrial equilibrium of the state is seriously disturbed. But no truer statement of these disastrous results can be made than that set forth by our Maine supreme court, in that opinion which deservedly called forth the admiration of President Roosevelt.

In this opinion, our jurists have taken an advanced position in the protection of the public's interest in the forest, yet they have not misjudged the state's need of protective legislation. For weeks now we have seen the danger signal each evening as the sun sinks in the west, and the issue of the hour is plainly the conservation of our forest lands. You business men of Maine should stand shoulder to shoulder with your supreme court justices and ask for the prompt enactment of laws which will preserve for our children the forests and water powers of Maine.

The forestry problem in Maine presents to me a two-fold aspect. First of all, the system of taxation of forest lands must be one to encourage the gathering not of one crop alone, but

of many harvests of trees from these lands which are fitted only for timber culture. I have very vivid memories of the cut-over lands of Michigan, and that is a state where a faulty policy of heavy taxation led the landowners to strip their lands of the valuable pine and then abandon the barren hills and plains to the state. The most practical precaution against over-cutting on private lands would seem to be the automatic restriction which is being advocated here in Maine: namely, the method of taxing what is cut rather than what is left. The other part of the problem, however, presents a more urgent need than any scheme of protection of these timber lands from the greed of private owners and that is the necessity of safeguarding these lands from utter devastation by fire. Here lies the opportunity of the executive officials of the state for I deem it their duty to be as progressive and far-sighted as the state judges. This is no time to fall back behind precedent, nor to stand pat upon past procedure. There are exigencies that create and justify new methods of protecting the public interest. Our supreme bench is quoted by trade and commercial journals as far as the Pacific coast—do we wish it said that our judiciary constitute our only guardians of the public interest? Is there or is there not a law requiring efficient spark arrestors on locomotives? If such a law is on the statute books, why is it not enforced by those appointed to execute the laws of the state? Or are they awaiting resubmission of this statute also?

It will be written down to the credit of the Roosevelt administration that the federal officials have been aroused to a new appreciation of their obligations, not to this or that great interest, but to the public at large. The bureau officer at the center of government no longer complacently takes the Vanderbiltian view of public service; he gets busy in the performance of his whole duty as a servant of the people. This reform has been accomplished by placing before the whole departmental service the true aim and purpose of government: namely, that of securing for every citizen all his rights and privileges. There is nothing new in this idea, but its manifestation has not yet become common enough, and the Roosevelt idea of stirring up public officials might well go beyond federal circles.

As a fellow servant of the people then, I would urge the state officials to meet the present emergency with the sole purpose of protectng the public interest at stake. Both executive and legislative branches must approach this forest problem not from the standpoint of the railroad companies, nor that of timberland proprietors, nor that of the pulp or lumber-mill owners, though we may agree that all these classes deserve much consideration, nor from that of any other special interests, but from the viewpoint of the whole people, whom alone you represent. Burn off the forests of the state, dry up its rivers, lay waste its land, and it will be not the timberland owners or the great manufacturing corporations, but the people at large who will suffer most. and, as I understand it, that is the principle set forth in the supreme court opinion that we do well to quote, to consider, and to act upon.

I am not satisfied that the idea now current as to the status of the wild lands of the state as regards trespass is correct. The right of the public to hunt over the lands in private ownership is a question I will leave to the students of the law, but I would challenge the right of the public to build fires upon these lands. I cannot believe that the common law grants to a landowner the right to make any use of his own land that will endanger the property of his neighbor, and the general public should hardly expect any privileges that do not belong to the owner himself. Those who have in charge the execution of our state laws in protection of these wild lands may well at a time of exigency like the present prohibit the building of fires by those who wish to traverse the timber lands. Should such a prohibition interfere with their hunting, their loss con-

sequent upon such interference is outweighed by the danger to the property of others and to the public good that surely results from their camp-fires. When the interests of the Maine public are at stake, our law officers must surely be able to find some legal protection against non-resident tenderfeet.

The opportunity before our state officials is an exceptional one. By increasing the efficiency of the present admirable forest fire warden system, by expending larger sums before the fires start and relying less upon the average rainfall, by promptly meeting each new problem with the proper initiative and independence by considering the interest of the whole people, and that alone, they can insure the future prosperity of the state and be public benefactors in fact. Some of us may advocate the conservation of the state's wealth, to these officials comes the privilege of actually protecting these resources.

REPORT OF THE WATER SUPPLY COMMISSION OF PENNSYLVANIA

ONE of the most enlightening and useful papers of the year on stream flow and water supply is the Report of the Water Supply Commission of Pennsylvania for 1907. The Commission was established in 1905 to procure facts concerning the water supply of the state and to provide for its utilization, conservation, purification, and equitable distribution.

In 1907, the jurisdiction of the Commission over the water companies of the state was increased by requiring all applications for charters for water and water-power companies to name the waters which it is proposed to use, by requiring all agreements for the consolidation or purchase of water or power companies to designate and limit their source of supply the same as original applicants for charters and by requiring all companies subject to the provisions of the law to procure the approval of the Commission before they can take or use any new or additional source or supply.

To intelligently carry out the provisions of this comprehensive law the Commission found it necessary to study the water supply of the state from several aspects. Particularly it had to give attention to the influences which are working to reduce the available water supply and to render stream flow more irregular.

Fortunately for the Commission it was provided with funds sufficient for the employment of an able corps of engineers under the charge of Mr. Farley Gannett. Mr. Gannett and his assistants have not been satisfied merely to compile information. They have done this, to be sure, have compiled much in fact, but they have also gone after original data on the topographic and hydrographic conditions of the state.

The Commission has given a large amount of attention to the obstruction of streams through various kinds of development work. Its investigations have brought to light the existence of serious conditions in several important streams. For instance, "the carrying capacity of the Kiskiminetas River has been greatly reduced by the flattening of the slope by deposits carried down from above, and by encroachments along its bank, while changing conditions in its watershed make necessary a greater facility for discharge. This stream was one of the chief contribu-

tors of the great flood at Pittsburg in March, 1907."

No one will question but that it is for the best interest of the state that hereafter any obstruction to a navigable stream must first be approved by the Commission.

Upon no part of its field of inquiry does the Commission lay greater emphasis than the relation of forested watersheds to stream flow. An entire chapter is given to this subject and considerable original data is presented for several Pennsylvania streams. How thoroughly the Commission is convinced of the fundamental importance of forests to stream flow is shown by the following statement which occurs in the introductory part of the report:

"One of the causes which lessens the available water supply is deforestation, and the results of the work of this Commission show that stream flow is more irregular than formerly, and the value of the streams to the Commonwealth greatly decreased for this reason. The investigations of the Commission on this subject demonstrate that, in order to preserve the present value of our streams, active steps must be continued to protect and preserve the existing forest lands of the state, as well as to reforest those districts which have been denuded of the timber land.

"The effects of floods upon the streams of this state have been given careful consideration by this Commission, and wherever possible flood conditions have been carefully studied. The control of floods is closely allied with and interdependent upon the development of water power, and the results of the investigations of this Commission on these subjects are set forth in detail in the following pages. Flood influences may be ameliorated by reforestation of the denuded forest areas of the state, by the construction of extensive storage reservoirs for excess waters, and by the straightening, widening, and deepening of the channels of streams. The interest recently taken in inland navigation, to effect which would necessitate the erection of numerous dams, and the revival of the use of water as power, may aid in protecting the streams of this state against flood. Through whatever means such results are accomplished the effect will be both a decrease in the damage to property and also an increase in the available water supply. The larger streams of this state may not yet have reached the condition where conservation of the water in reservoirs for supply purposes is necessary, but provision must be made by means of reforestation and reclamation of streams which are now undesirable for use, to keep the supply at its present capacity."

The Commission does not stop with the mere statement that deforestation is bad. It says in effect that the condition is so bad that it must be remedied and that it must be done through the protection or renewal of the forest. It heartily endorses the work of the State Forestry Reservation Commission in establishing state forest reservations on the headwaters of streams to the extent of over 750,000 acres. and in introducing scientific methods of lumbering and forest culture. It favors the legislation now pending in the Federal Congress, providing for National Forests in the Appalachian Mountains, extending over the headwaters of the Monongahela River.

Working in accord with the Forest Reservation Commission as it is doing, the possibilities of usefulness of the Water Supply Commission to the great Commonwealth of Pennsylvania can scarcely be overestimated. Its results should attract the notice of other states where the need of a similar body of authority on water supply is equally great.

BEARING OF THE PROPOSED APPALACHIAN FOREST RESERVE ON NAVIGATION

By W J McGEE, LL.D., Expert, Bureau of Soils, Department of Agriculture
(Secretary U. S. Inland Waterways Commission)

THE states whose rivers will be directly influenced by the Appalachian Forest Reserve when established are Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, with northern Florida. Their area is 400,000 square miles. The rivers comprise the principal tributaries of the Ohio, including the Cumberland and Tennessee; the Mobile system, including especially the Alabama and Tom Bigbee, with their leading affluents; the Appalachicola system, of which the chief members is the Shappahooche; the Ocmulgee, Altamaha, and Ogechee systems; the Savannah and Coosawhatchie, Edistow, Santee, and Pee Dee systems; the Cape Fear, with some of its affluents, the Noose, Tar, and Roanoke, with connected waters; the James and Rappahannock; together with the great bordering rivers, especially the Mississippi and Ohio, which extend the influence into all the adjacent states.

The mean annual precipitation within the states directly influenced by the Appalachian forests is about fifty inches; the total quantity per year is about 45,000,000,000,000 cubic feet. This boon from the skies is the chief value of the region; it controls production; it determines the value of form lands; it fixes sites of towns and factories; it forms ways for water traffic and governs other lines of commerce. Without it the region would be a bare and uninhabitable desert; with it the far-reaching hills and dales have made homes for 20,000,000 sturdy and independent people, and are capable of sustaining many times that number.

Of the 45,000,000,000,000 cubic feet of water annually distilled from the clouds, perhaps a half is returned to the air through evaporation; this tempers the atmosphere and acts as a blanket retaining the warmth of the day throughout the night; a part of it forms dew which sustains vegetation, while a larger part drifts away to maintain that atmospheric condition and circulation on which the habitability of the region depends no less than the direct precipitaton. About a quarter of the aggregate rainfall is absorbed by the earth or consumed in chemic changes, chiefly connected with growing plants. The remaining quarter gathers into streams, of which the larger are navigable; and all parts of each river system from its sources in the forest-clad Appalachian ranges to its mouth are interdependent of the 10,000,000,000,000 or 12,000,000,000,000 cubic feet of water annually flowing from this greater Appalachian region into the sea. More than half flows through navigable channels—it forms the sole and entire basis of interstate and intrastate waterway commerce throughout what may be called the waterway states; and it virtually controls the interstate commerce on the bordering rivers—the Ohio and the Mississippi. Many primitive peoples worshiped rivers and imputed to them supernatural attributes; even within our own times some regard them as mysterious in their movements

and wholly beyond human control; but with advancing conquest of the earth's surface, the mystery of rivers has been cleared away, and their origin and growth no less than their uses are coming within everyday knowledge. Today the commercial and industrial values of our running waters can be appraised and controlled about as definitely as those of our lands.

In a state of nature the slopes of the land, the texture of the soil, and the vegetable cover are brought into adjustment during ages in such manner that most streams flow fairly clear, and in fairly uniform volume throughout the year—there is a general equilibrium or balance extending all the way from the hillsides on which the storm-waters gather to the coast where the flow returns to the sea. When the rain falls on a forest the beating drops are broken into spray which soaks gently into the mulch or trickles down the trunk and roots into the earth; the moisture seldom collects in gully-making rills, but forms a ground-water which soaks deeply, to finally reappear as clear springs or seepage in the banks and beds of the spring branches. Over prairies the sward in time grows so tough as to resist the beating of the storm, while the grass helps to retain the moisture and reduce run-off, with attendant gullying; yet in a state of nature the slopes of prairie-lands are always gentler and flatter than those of woodlands, in which the surface is better protected from the elements. In both types of surface (and in all intermediate types) the final or optimum condition toward which all the agencies tend is one in which nearly all of the precipitation soaks into the earth to form a ground-water, leaving little run-off on the surface; in which condition springs abound, floods seldom reach great heights, and the streams are seldom dry or even low in summer or between storms. In this condition there is little soil erosion, and comparatively little scouring of beds, building of bars, or shifting of channels in the lower reaches of the rivers. Judging from the best geological data available, the annual soil-wash from the 400,000 square miles of what may now be called the Appalachian states was less than 75,000,000 tons, perhaps less than 50,000,000 tons annually; while the range from high to low water in the mill streams, and even in such rivers as the Tennessee, Cumberland, Alabama, and Savannah, was not such as to interfere seriously with control for power in the upper reaches or with navigation in the lower reaches.

The effect of settlement throughout this region has been, as elsewhere, to distribute the natural equilibrium or balance, whereby both the soil and its cover and the running waters are controlled. It is everyday knowledge that springs have failed in thousands; that spring branches have run dry; that it has become necessary to deepen wells; that brooks once clear and fairly uniform throughout the year now run muddy when they run at all, and range from destructive torrents after storms to trifling rivulets during droughts; and that the utility of the upper reaches for power and the lower reaches for navigation has been greatly reduced. The reason is now a commonplace of daily knowledge: The leading factor is deforestation of the uplands, whereby the surface is exposed to the elements, and the storm waters gather in torrents, cutting gullies, flooding bottoms, carrying debris over the lowlands, and choking the channels even of the larger rivers. Next in gravity is thoughtless farming, so conducted as to expose a thin layer of friable soil to storms, whereby the fields are gullied and impoverished, and the richest and most soluble portions of the soil are swept away—to accumulate in the lower reaches and either bar navigation or compel expensive dredging to maintain it. The change from the natural condition cannot be measured without extensive observations and surveys; yet any one familiar with the region and observant of the changes of the past quarter century must estimate that the annual soil-waste is at least doubled and that the range from freshet stage to low water is increased from fifty to

over 150 per cent. in different localities, or an average of probably 100 per cent. throughout the entire area. Undoubtedly even the bordering rivers—the Ohio and the Mississippi—have suffered an increase in range materially affecting both navigation and general industrial development. Nor can any one familiar with the region and acquainted with those natural processes whereby soils are formed, vegetal covers produced, and uniformity of streams maintained fail to see that the damage is increasing in a geometric ratio, the loss during each decade averaging twice that of the decade before; nor can he fail to foresee that unless the present tendencies are checked much of the Appalachian upland will be reduced to barren rock, the soil of the lower hills swept away, and in precisely the same measure the headwater streams reduced to storm torrents, and the lower river channels converted into sand washes, like those of the arid region, or capricious volumes and mud-laden waters, utterly useless for navigation and impossible for terminals. Recent river work proves beyond all question that the value of a river for navigation depends no less on its sources than on the character of its channel; that the river system is a unit from headwaters to mouth; and that in such rivers as those heading in the Appalachian region it will be impossible to maintain navigation in the lower reaches without protection of the mountain slopes and the myraid springs whence the waters flow.

PRESERVE THE SOIL

Dedicated to Dr. W J McGee

By JOHN A. JOYCE

THE rolling hills and mountains
Without their forest dress
Will soon bring to the nation
Great hunger and distress,
And if we do not listen
To the scientific strain
The soil of grand Columbia
Will be washed away by rain.

Brave Nature in her glory
Works for animated things
And tells the old, old story
Of feeding serfs and kings,
But man obtuse and greedy
Will not listen in his pain
To the poor and weak and needy
Who must live by sun and rain.

We must save the soil and water
Or a desert there shall be,
For wife and son and daughter
In this Land of Liberty;
And the Congress of the nation
Must now listen to the brain
Of our scientific sages
Who would husband soil and rain!

BOOKS ON FORESTRY

THE movement to study and preserve our forest trees instigated within the past few years has stirred up more than usual interest, not only among those whose business interests are concerned, but among the American people at large. Forestry to-day is the most important consideration in the general plan of conserving our national resources. To care for the vast timber tracts and to reforest the thousands of acres bared by former mismanagement is the proposed work that will bring greater results than any other national effort ever made in our country. And an issue of this sort gives rise to the usual literary danger—a multiplicity of books offering little practical return for the price paid for them.

When a book on trees is advertised it usually finds a ready market. And as such publications entail illustrating necessarily expensive, the cost per volume is much above that of the average book. And many of these books are very disappointing. One recently published, with a very seductive title, generalizes to such a liberal extent that *Ginkgo* and Southern Yellow Pine are introduced as representative conifers. In a way, this is true; but put in this manner, the truth is misleading. The *Ginkgo* is a geological curiosity and has a romantic story; but the long-leaf pine of the South means millions of dollars annually. This little book mentions eight species of pine (two of these being exotic) and there are thirty-nine species of commercial value in the United States. And I did not see a single species of the many Western oaks described in its pages. Clearly a book of this kind means little to the real forest student. What he requires is a book covering these topics:

1. A list of our forest trees.
2. Botanical descriptions.
3. The definite locality of trees listed.
4. A statement of their value.

And with the last consideration comes the outlook that concerns us as a nation: Investigating sylvical conditions. Are our forests sufficiently studied, cared for, and preserved? Can waste tracts be reforested? The very nature of underbrush and shrubs, and even weeds and grasses, often help and suggest, or seriously hinder reforestation. The writer on subjects pertaining to forestry must be a broadly educated teacher. He must know that elementary training in any field should be sharply accurate, and very much to the point if successful instruction is sought. And it must be persistently borne in mind that long before the tree becomes *timber* it is a *plant*. The *tree* is *cause;* the nicety of the lumberman's calculation, the rise and fall of prices, the Nation's tremendous utilization of forest produce, is *result*.

It might therefore be suggested to all who would promote the study of forestry (and the study should be promoted even in our primary schools), to write, to recommend, and to buy books on the subject with care.

A BEGINNER IN FORESTRY

By ANNE WARNER

Paper Three

I MEANT to write an article on the beginnings of German forestry, but I must defer that until I can get some books, as the only book which goes far back, in my present library, is one which tells how Bavaria, under the Agilolfinger, was divided—not by woods—but into cleared districts or plain land. It's very interesting to read, but doesn't bear much relation to our subject—unless, indeed, one goes out of his way to wonder if, perhaps, America won't be divided into plains and cleared spaces herself before long. I suspect that the forest is such a menace to new society, and such a problem to settlers, that its destruction is simply a rule of economics, which each nation has to solve summarily in the beginning. They all solve it pretty much the same way, too. And then comes the same result.

In lieu of a nice story about the When and Where, I am forced to offer this time a riddle which racked our brains and which may be simpler to others, but is still complex to me.

Yesterday we were all in the woods, and there we came suddenly upon one of the most wonderful sights which I have ever seen. It burst upon us quite unexpectedly, and stopped us short. There we stood—"we" being the women, two men, a small girl, a donkey and a poodle—and this is what we saw:

An enclosure about 100 by 200 feet. Around it posts five feet high, with a wire running on top. Below the wire a wide-meshed net, pegged to the ground occasionally (not so often as "semi-occasionally," but rather quadri-occasionally, I should say). In a few places the net was carefully tied to the wire above. There was something so naive and childlike about the whole treatment of the net—something which led us to hold the poodle from diving under it—something which savored of the wickedness of picking the pockets of a sleeping friend. No one would have willingly desecrated the purpose of the net, and all that troubled us was that it was so hard to guess its purpose from its behavior, that we hesitated for fear of doing so.

And, after all, the net was only the frame of the rest of the riddle. Within the guarding net were long rows of stout twigs, each with a bit of twine tied to its top. The bits of twine were about eight inches long, and each had an old rag tied to the other end. The little rags all waved in the breeze. Two of the twigs were crowned with odd bunches of dead leaves tied up in old cloth; two others were crowned with tin cans; in the center of the whole an old umbrella was carefully pegged down.

Nothing so weird and mysterious was ever seen before. Some one who had never been in India, said it made him think of an Indian graveyard, and some one who had never known a ghoul said it looked ghoulish to her. We all stood and wondered for a long, long time, and the only opinion hazarded was that it was to catch rabbits. In view of the laxness of the net, this might sound absurd, only that we have learned by experience that the Lichtenberg ideal of a trap is very novel indeed. The mouse traps here are two-storied, with a window upstairs. After the mouse is caught, he leans in the window—literally on his elbows, for I've seen one caught—and as soon as the

trap is set down, he jumps gaily out and runs home. Such being a mouse-trap, the tastefully looped net looked as much like a rabbit-trap as anything. Susy suggested that the bits of rag might have been dipped in something of which the rabbits liked the odor.

So we stood for a long time, contemplating the curious whole, and then we tore ourselves away and went home to ask questions.

The forester, whom we asked, said that it was all a wood nursery—the rags wave birds away, and the net keeps out the rabbits. His statement was final, so now we simply wonder. It is impossible to disbelieve or doubt, but one may still wonder. I should like a dictionary that would elucidate the umbrella—even a glossary as to why peg or why not peg, would help a little.

But whatever they put down or tie up in this careful land, still one must give the most unqualified praise to the results. The trees are aflame now, and even the continual rain of gold cannot disturb the calm and beautiful order of the German forest. Every wide and imposing avenue is carpeted with yellow and brown, and on either side, stretching endlessly, lies the same fair, soft covering. I don't know when the work is done—we never see or meet a man. The gutters are latticed neatly to keep the leaves from choking the covered ways, the piles of firewood grow steadily greater, the troughs are kept spaded clean, the roads are mended with a skill that puts our countryways of dust and pebbles to eternal shame—and yet one sees no one. They must do it all early, early in the day. Or else it is gnomes. I am so glad that I believe in fairies, dryads, and the whole blessed troupe of woodfolk. It makes me better and happier, more full of reverence for the green Heaven, which is so much nearer than the blue one, and more trusting and hopeful that if we prove worthy the kind little creatures will come our way soon, build us big, wide, hard roads, and open all their treasure-sacks for those two precious factors in society—the poor and the generation to come Germany is so thoughtful for both of these; the village is getting in its firewood daily now, and over there, beyond the open pasture, are trees that will grow until 1950, while the net over which we looked, laughing, hedged in the trees that will ward away the sun from the weary-footed of 2100.

And to think that all this beauty and order is fixed and changeless. That it is not a problem, but an answer. I began with a riddle because, like all seekers for knowledge, I find riddles easier than their reading—but I end with an answer for one of the world's greatest questions—a question which Germany has answered. And answered in such a splendor of perfection, for out of the royal generosity of its good, practical purpose, the German Government's forestry not only pays profit as an investment, but feed health, strength, and happiness into all its people. And not only in its people, but into the stranger within its gates. When I think that in Napoleon's day these trees were being guarded for me to walk beneath this year!——

(There is a moral which belongs right here, but no one likes morals, so I'll leave it out.)

TREES IN THE PHILIPPINE ISLANDS

ONE cannot realize the richness of the tree flora of the Philippine Islands until he is told that there have already been found over 2,000 kinds in the Philippine Islands. This means more to the average person when it is known that here there are probably three times as many varieties as have been found in the United States. When all is known concerning the tree flora of the Philippines, it is probable that this number will reach 3,000. Of course, it must be stated that all of these are not used commercially. It is estimated that 150 of them are on the market at the present time. Many of the 2,000 are too small to ever be of any great importance commercially.

About one-half the area of the Philippine Islands, or 60,000 square miles, is in public forest. Of this 60,000 square miles, more than one-half is in mountainous regions, and will not yield, at the present time, much wealth to the Philippines. Indirectly they are of very great importance, for upon them will depend the conservation of moisture, so necessary to extensive irrigation schemes. Less than half of the 60,000 square miles can be classified as forest which will yield commercial varieties of timber. A rough estimate will place the yield of this forest close to 40,000,000,000 board feet. If this could be placed on the market to-day, at the price of our cheapest timber, it would bring a total of two and a half billion pesos. Of this two and a half billion pesos of wealth, the Bureau of Forestry is the guardian. It is the object of this Bureau to have the wealth utilized as rapidly as it can be without danger to the forests. It is believed that about four times the present amount used can be exploited without endangering our forest. This would bring the annual amount of timber put on the market, from 100,000,000 board feet, the present amount, to 400,000,000 board feet. This would leave 300,000,000 board feet to be exported from the Philippine Islands, and thus bring to the islands considerable wealth.

Included in the 1,800 or more comparatively unknown woods now reposing on herbarium sheets in Manila, and bearing scientific names but no information of commercial importance, are many which will, in time, and after investigation, prove valuable.

The rating of the relative values of this assortment of trees; the distinguishing between those commercially valuable, and the others; the testing of those which have been selected as commercially desirable, to ascertain their strength and fitness; the supplying of merchants and engineers with specimens and information and the directing of all concerned how to obtain the maximum good with the minimum waste from our wooded lands—these are a few of the problems which daily confront the Bureau of Forestry of the Philippine Islands.

INCREASE IN 1907 LUMBER CUT

FIGURES of the lumber cut in 1907, compiled by the Bureau of the Census and the Forest Service, showed the largest total ever reported in the United States, exceeding complete than ever before. The figures disclose some interesting facts.

In 1907, 28,850 mills made returns, and their production was over forty billion feet of lumber. This is believed to

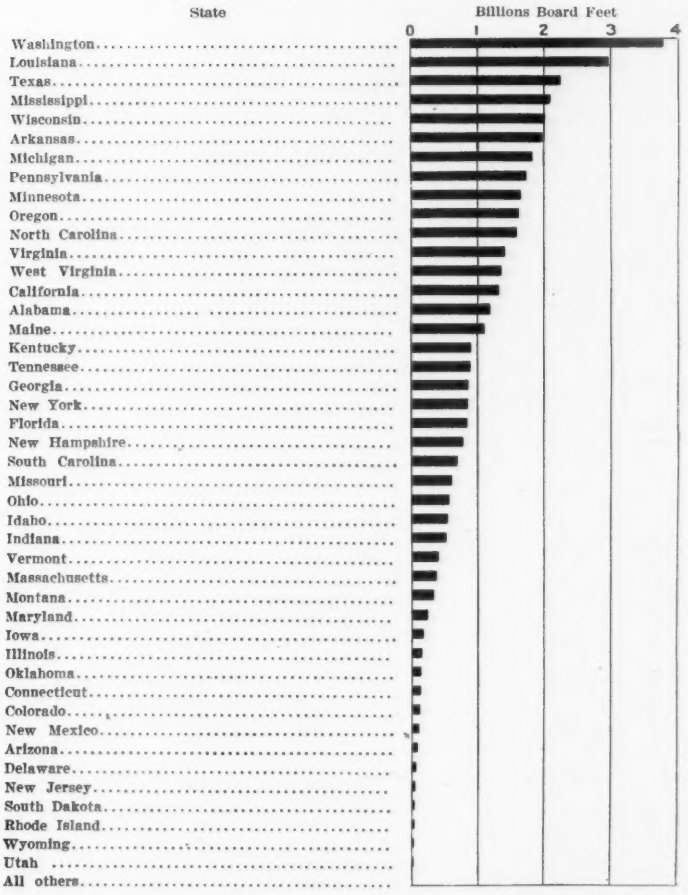
Table I.—*Production of lumber by states, lumber cut* 1907-1906

States	1907	1906	Per cent. increase from 1906
	M. feet	*M. feet*	
Washington	3,777,606	4,305,053	-12.3
Louisiana	2,972,119	2,796,395	6.3
Texas	2,229,590	1,741,473	28.0
Mississippi	2,094,485	1,840,250	13.8
Wisconsin	2,003,279	2,331,305	-14.1
Arkansas	1,988,504	1,839,368	8.1
Michigan	1,827,685	2,094,279	-12.7
Pennsylvania	1,734,729	1,620,881	7.0
Minnesota	1,660,716	1,794,144	- 7.4
Oregon	1,635,563	1,604,894	1.9
North Carolina	1,622,387	1,222,974	32.7
Virginia	1,412,477	1,063,241	32.8
West Virginia	1,395,979	976,173	43.0
California	1,345,943	1,348,559	- .2
Alabama	1,224,967	1,009,783	21.3
Maine	1,103,808	1,088,747	1.4
Kentucky	912,908	661,299	38.0
Tennessee	894,968	634,587	41.0
Georgia	853,697	831,675	2.6
New York	848,894	810,949	4.7
Florida	839,058	888,137	- 5.5
New Hampshire	754,023	539,259	39.8
South Carolina	649,058	566,928	14.5
Missouri	548,774	507,084	8.2
Ohio	529,087	438,775	20.6
Idaho	513,788	418,944	22.6
Indiana	504,790	447,808	12.7
Vermont	373,660	329,422	13.4
Massachusetts	364,231	354,483	2.7
Montana	343,814	328,727	4.6
Maryland	213,786	219,098	- 2.4
Iowa	144,271	163,747	-11.9
Illinois	141,317	141,374	- .0
Oklahoma	140,015	49,737	181.5
Connecticut	140,011	124,880	12.1
Colorado	134,239	110,212	21.8
New Mexico	113,204	103,079	9.8
Arizona	72,134	56,960	26.6
Delaware	50,892	44,487	14.4
New Jersey	39,942	36,253	10.2
South Dakota	34,841	22,634	53.9
Rhode Island	32,855	21,528	52.6
Wyoming	17,479	13,213	32.3
Utah	14,690	7,768	89.1
All others	5,891	170	3,365.3
Total	40,256,154	37,550,736	7.2
Mills reporting	28,850	22,388	28.8

- Indicates decrease

by over seven per cent. the cut reported for 1906, until then the record year. This does not necessarily show a larger actual cut than in 1906, for the returns obtained last year were more include ninety-five per cent. of the actual cut. In 1906, 22,398 mills reported about thirty-seven and one-half billion feet. Since, according to these figures, nearly twenty-nine per cent. more mills

Table II.—*Lumber Cut, by States, 1907*



reported last year than the year before, while the increase in production was only a little over seven per cent., it might be thought that the amount actually manufactured must have been greater in the earlier year. This, however, would be a too hasty inference, for it is almost wholly among mills of small individual output that the gain in the number of establishments reporting has been made.

A classification of the returns by states and regions throws additional light on the situation. Individual changes, as, for example, the remarkable rise of Texas from eighth to third place among the lumber-producing states, are doubtless accounted for primarily by the greater accuracy of the 1907 figures; but in the majority of cases the advances and declines can be traced to specific influences.

Before the year closed the general business depression was severely felt in the lumber industry. It was not, however, the most important cause of a falling off in the production of the year where a falling off occurred. For decline in production took place only in certain regions. The South is the

region of greatest activity in lumber production, and yellow pine the most important wood, forming thirty-three per cent. of the entire cut of the country. The cut of yellow pine reported shows an increase of thirteen per cent. over that of 1906. In the early part of the year many of the southern mills cut so heavily that, in spite of the curtailed this group of states as the most important source of lumber supply. Since southern pine is abundant in all the Atlantic coast states from the Carolinas to Texas, the region as a whole will doubtless maintain its leading position for some years, in spite of the fact that at the present rate the bulk of the timber will be gone in another decade; but

Table III.—*Production of lumber, by kinds*, 1907-1906

Species	1907	1906	Per cent. increase from 1906
	M. feet	*M. feet*	
Yellow Pine	13,215,185	11,661,077	13.3
Douglas Fir	4,748,872	4,969,843	- 4.4
White Pine	4,193,787	4,583,727	- 8.5
Oak	3,718,760	2,820,393	31.8
Hemlock	3,373,016	3,537,329	- 4.6
Spruce	1,726,797	1,644,987	.5
Western Pine	1,526,116	1,386,777	10.0
Maple	939,073	882,878	6.3
Poplar	865,536	677,670	27.7
Cypress	757,639	839,276	- 9.7
Red Gum	689,200	453,678	51.9
Chestnut	653,239	407,379	60.4
Redwood	569,450	659,678	-13.7
Beech	430,005	275,661	55.9
Birch	387,614	370,432	4.6
Basswood	381,088	376,838	1.1
Cottonwood	290,574	269,458	8.0
Elm	260,579	224,795	15.9
Ash	252,040	214,460	17.5
Cedar	251,002	357,845	-29.9
Larch	211,076	166,078	27.1
Hickory	203,211	148,212	37.1
White Fir	146,508	104,329	40.5
Sugar Pine	115,005	133,640	-13.9
Tamarack	113,433	123,395	- 8.1
Tupelo	68,842	47,882	43.9
Sycamore	46,044	. . . . .	. . . . .
Walnut	41,490	48,174	-13.9
All other	80,973	164,845	-50.8
Total	40,256,154	37,550,736	7.2
Mills reporting	28,850	22,398	28.8

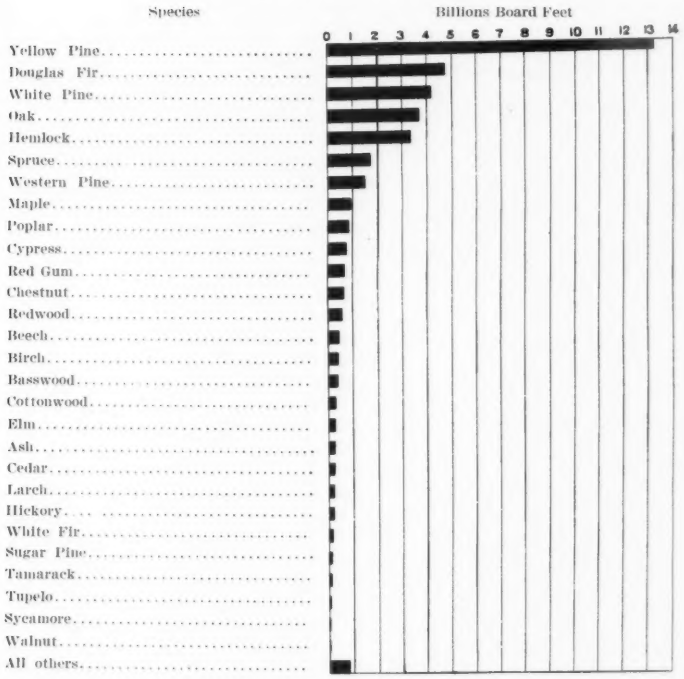
—Decrease

output which followed the business disturbance later, the total was greater than ever before. But in both the Lake States and the Northwest a smaller cut was reported than for 1906, though the number of mills reporting increased.

In the Lake States the falling off evidenced the waning supply of white pine. Michigan, which for many years led all the states in lumber production, and then gave way to Wisconsin, sank in 1907 from fourth to seventh place, while Wisconsin went from third to fifth. Minnesota as late as 1905 held fourth place. Last year it went from seventh to ninth. It was not until the latter nineties that the South displaced in totals of production by individual states the leadership has since 1905 been held by Washington.

The figures of production show that during 1907 Washington fell off very decidedly from its huge cut of 1906, while its sister state Oregon, is credited with a slight increase in its total. In the early part of the year Washington suffered from a car shortage, and at the end the combined effects of business disturbance and higher freight rates had brought the industry almost to paralysis. Oregon kept up its cut because of its larger proportion of coastwise and foreign trade. These two states together produced more lumber

Table IV.—*Lumber Cut, by Species, 1907*



than any other two states in the Union.

It is a striking fact that though lumber prices have been steadily going up during the last half-century, the per capita consumption of lumber has also been going up. In 1850, according to the best figures obtainable, the average consumption to each person in the country was 250 feet; in 1900, 460 feet; and in 1907, 480 feet. This illustrates what has been found true the world over—that with industrial progress the demand for wood becomes greater and greater.

FOREST SCHOOL NOTES

YALE FOREST SCHOOL

ONE of the important features of the Yale Forest School is its summer work in Pennsylvania. The school has a fully equipped plant for field instruction at Milford, Pa., located on the estate of the late Mr. James W. Pinchot who was very much interested in this work and contributed generously to its establishment and support. Attendance at a summer session at Milford is required of a regular junior class of the Forest School. This term is given at the beginning of the course. The work during this term comprises Field Surveying, Forest Mensuration, Forest Botany, and Silvics. The instruction is largely in the field.

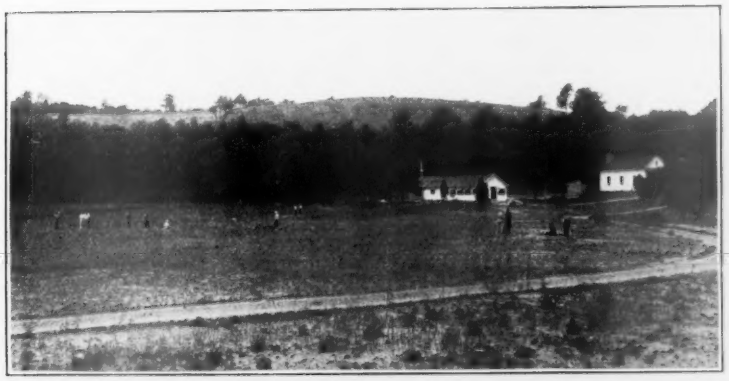
The Forest School has conducted at Milford also a short course in forestry designed for woods superintendents, prospective forest students, and others who wish to obtain a short general course in the subject.

During the past summer there were in attendance at Milford forty-six men taking the regular junior work and sixteen men in the short course.

The fall term has opened with a substantial increase over the preceding year in the number of students. There are registered seventy-one students in the regular department and seventeen men from other departments of the University taking special work at the Forest School.

Yale Summer Camp, Milford, Pa.

Yale Summer School of Forestry



Class Surveying at the Summer School

Students Taking Tree Analyses

The new catalogue of the school shows a number of new courses which very substantially enrich the curriculum. The Forest School now affords an opportunity for advanced post-graduate work along special lines. Hitherto the course has been prescribed and there has been little opportunity for specialization. There is now, however, beginning to be a demand at Yale for post-graduate work by graduates of forest schools who wish to specialize in certain branches. A number of advanced courses are now offered and there will be a distinct development of instruction along this line as rapidly as the circumstances warrant it. The new courses are chiefly in subjects related to Silviculture, Forest Management, Forest Products, Engineering, and Lumbering.

PENNSYLVANIA STATE COLLEGE, DEPARTMENT OF FORESTRY

THE Department of Forestry of the Pennsylvania State College has added an assistant in the person of Mr. John A. Ferguson. Mr. Ferguson, who takes up his work on September 1, as an assistant in the Department of Forestry, comes originally from Canandaigua, N. Y. He received his preparatory training at the Canandaigua Academy, and was graduated from Hamilton College with the class of 1896, receiving a degree of A.B. In 1903 the same institution conferred upon him the degree of A.M.

Upon graduation from college, Mr. Ferguson began teaching in the Brooklyn Polytechnic Institute at Brooklyn, N. Y., and continued this work at Fond du Lac, Wis. For several years he was instructor in Science at Rutgers College Preparatory School, New Brunswick, N. J. In July, 1906, Mr. Ferguson entered the Yale Forest School and was graduated in 1908 with the degree of M.F. While in Yale, Mr. Ferguson assisted Professor Tracy, of the Sheffield Scientific School, in Surveying, and later assisted Professor Chapman, of the Yale Forest School, in field work carried on by the senior class of the Forest School in Alabama. During the summer of 1907, Mr Ferguson was a log scaler with the Pigeon River Lumber Company, of North Carolina. Upon completion of the course in Yale Forest School, he entered the United States Forest Service, and spent the summer season of 1908 upon the Boise National Forest with headquarters at Boise, Idaho.

Mr. Ferguson comes to the college with unusual training, and his connection with the Department of Forestry will mean a great deal in the development of that work in this college.

Prof. Hugh P. Baker, of the Pennsylvania State College, Department of Forestry, writes:

"Since the opening of our school year, we find that we have between fifty-six and sixty men classified in our four-year course in forestry. These men are divided as follows: Senior year, four men; Junior year, eight men; Sophomore year, fourteen men; Freshman year, thirty men.

Our forestry society, which was organized last year, has held two meetings, with an attendance of forty to fifty at each meeting."

COLORADO SCHOOL OF FORESTRY

ALTHOUGH forestry in this country is comparatively a new science, the progress that has been made is wonderful. The foresters were in the beginning chiefly young men who had been trained according to the principles in vogue in Europe, and the conditions are so different in this country that these principles had to be considerably modified to meet our own needs. Practically all the first work was necessarily of an experimental nature. Of course, mistakes were made, yet under the conditions it is gratifying that there were not more.

In a country of nearly 4,000,000 square miles, with climatic conditions varying from those of the tropics to those of the arctics with regions of abundant rainfall and others of practically no rainfall, with bare rocky mountains, broad fertile valleys, and extensive plains, and with forests richer in species than those of any other country of similar latitudes, it is indeed a problem to work out the varying needs of the forests and the relation of these forests to the country. Hampered by public opinion, restricted by insufficient appropriations, and, above all, with a decided lack of trained men to carry on the work, the progress that has been made in forestry in this country is certainly beyond all expectations. But under the guidance of competent leaders, who were untiring workers and men of remarkably keen foresight, the fundamental principles which should guide the work have been derived with exceptional rapidity.

The people have been taught the necessity of preserving the forest, and public opinion no longer stands in the way of progress. We have learned this lesson well. We have also learned much about the care of the forest yet this lesson is far from done. In the matters of adequate appropriations and

Students Making Growth Studies

a sufficient force of trained men to carry on the work we are still far behind. For a proper administration of the forests larger appropriations and more trained men are needed in both the National Government and the state governments. More men are needed to carry on research work, work in education, work to bring the forests into a state of sustained productiveness, work to reforest the denuded forest lands, and work to guard the forests against fire and trespass.

Forest Growth Near Manitou

A number of schools for preparing men for these tasks have been established. Many of them restrict their field to special studies intended only to meet specific local needs. A few have complete courses for training professional foresters, and these are doing an exceptionally high grade of work. The majority of graduates take up their work with a showing of ability seldom met in the man just out of a technical school. It is unfortunate that up to the present time so little really adequate instruction has been given in the West, the field that is open to the great majority of trained men.

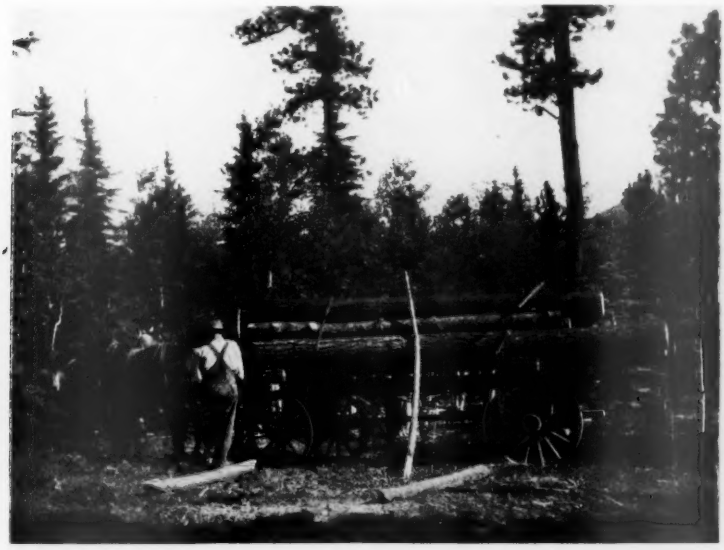
For obvious reasons instruction in all fields has developed more and more toward the laboratory method, and especially is this true in technical education. No technical school to-day would think of graduating men who have not had a thorough opportunity to work with the actual materials that form the constructive elements of their profession. Perhaps there is no other branch of education in which the necessity of solving the fundamental problems in the field is so great as it is in forestry. The laboratory of the forester is the field—the forest, the logging camp, the saw mill the lumber yard, and generally the field that uses forest products of any kind for raw material.

Of the 166,785,926 acres of National Forests over 162,000,000 are located in the Rocky Mountains and on the Pacific Coast. Of the professional men employed by the Forest Service over fifty per cent. are located in the West,

and under the new scheme of administration which distributes about one-half of the force formerly located in Washington to branch offices in the West, over seventy-five per cent. of the Forest Service employees are located here. Furthermore, as the great need for men is in the field, the majority of new men are sent to the West.

With the West as the great field of operation, is it not unfortunate that so relatively few of the men who will find their lifework here do not have the opportunity to use the forests of the West as a laboratory. The conditions of the country and of the profession make the demand for a good school of forestry in the West almost imperative.

In 1905, Gen. William J. Palmer laid the foundation for such a school at Colorado College by presenting the college with a tract of 13,000 acres of yellow pine forest near Colorado Springs in the heart of the Rocky Mountain Reserve Region. The tract is known as Manitou Park. It is surrounded on three sides by the Pike National Forest, and within a half-hour's ride by rail from Colorado Springs the Forest Service maintains one of the largest forest nurseries of the region. Through the courtesy of the Forest Service the students of the school of forestry are allowed to study the work that is being carried on in the National Forests, thus increasing the opportunities for a thorough field preparation and placing the student into direct contact with the work for which he is preparing himself.



Lumbering at Manitou Park

Manitou Park is under the direct supervision of the School. Logging and milling operations are now being carried on with a small portable mill, such as is common throughout the mountain districts. All cutting is done according to strictly scientific principles, with the result that there is an abundant young growth to cover the cut-over areas. During the past year an experiment station has been established in co-operation with the Forest Service for the purpose of studying the effect of different methods of treating mountain

forests. This should aid materially in the solution of problems that are now in doubt.

Although the regular course at the Colorado School of Forestry at first covered only three years, it has now been extended over four years and two summers, and graduates will be awarded the degree of Forest Engineer. In order to bring the school up to a very high standard, as well as to limit the number of students, the requirements will be made very strict and no student will receive a degree who is not a thorough master of his work.

The directors also believe that forestry as a profession has become so broad that no one man can become expert in all its various fields and that the time has come when some provision must be made for specialization. Plans are now under way whereby the students at the Colorado School of Forestry will be given an opportunity to specialize in connection with their work.

In many ways the opportunities for a good school of forestry at Colorado College are unexcelled and the directors of the school are making every effort to increase the endowment and to develop the school to its fullest capacity to meet the needs for which it was established—a school that can train men in the field where they will work.

MOTHER

By ELEANOR VAN ALLEN

O MOTHER Earth!—to whom we all return
And on whose breast we calmly lie asleep.
As in our earlier days, we slept in other arms;
Hold lightly thou, lightly and warm and close,
Rocking us gently, sweeping 'mid the splures;
Tho' we lie near or far from those we love,
Guard thou our ashes, tenderly and long;
Far from our anguish and our keenest joys,
Deeply enmeshed by roots of things to be
Ah! let us sleep—mourn, covered o'er with winter snows,
Cradled amid the Universe, till Spring shall come with flowers.

ORIGIN OF THE RESERVOIR SYSTEM IN THE UNITED STATES

By THAD. C. POUND

WHAT is known as the reservoir system was projected primarily for the improvements of river navigation, other anticipated benefits being regarded as incidental. Subsequent observation and experience have proven other results of equal value. The employment of this system presents three distinct benefits, either of them justifying the expenditure required to construct, operate, and maintain the works required.

First.—By the erection of dams upon the headwaters of navigable rivers, for the creation of vast reservoirs in which to impound and control the superabundance of waters produced by rains and melting snows in the springtime, disastrous floods occurring annually may be restrained. The destruction of property from such cause is beyond estimate, while the loss of human life has in many instances been appalling.

Second.—Those vast bodies of water so stored and controlled may be discharged as required during the low-water season, so as to maintain an equable volume for navigation.

Third.—By thus controlling and regulating the flow of water, improved water-powers upon the rivers and tributaries constituting an interest of great and increasing value, will be rendered safer and operated with greater regularity and efficiency. Engineering demonstration and actual use have already established the practicability and value of the reservoir system and placed it beyond the experimental stage.

The initial legislative movement toward the inauguration of the reservoir system was made at the special session of the Forty-fifth Congress, in the year 1877, by Representative Thad. C. Pound, of Wisconsin, in the presentation and adoption of the following joint resolution:

"Be it resolved by the Senate and House of Representatives of the United States of America, in Congress assembled, that the Secretary of War be, and hereby is, requested to make such preliminary examination of the headwaters of the St. Croix, Chippewa, and Wisconsin rivers, in the States of Minnesota and Wisconsin, as is consistent with his service to determine the extent and practicability of reservoirs upon the same, and report to this Congress the result of such examination, together with a compilation of all information and reports in his office bearing upon the subject of reservoirs, by February 15th proximo, or as early thereafter as practicable, and that he also report the estimated amount and character of the lands which would be submerged by such reservoirs."

Mr. Pound was prompted to take this action by reports theretofore submitted to Congress by the War Department, relative to examinations and surveys of the sources of the Mississippi in Minnesota, and the practicability of constructing reservoirs thereupon for the improvement of navigation of the Mississippi River, the "Father of Waters."

The work required by this resolution was promptly undertaken, and by authority of Congress, continued to completion upon the rivers named and other sources of the Mississippi. So encouraging and satisfactory were the results as submitted by the War Department to Congress, that an appropriation of $75,000 was made June 14, 1880, for the construction of an experi-

Little Falls Dam, on the Chippewa River, Wisconsin

mental dam and reservoir, and a further appropriation of $150,000 March 3, 1881, and again $300,000 August 2, 1882, to prosecute the work on the dams and reservoirs in the State of Minnesota, and to begin work on the Chippewa River and tributaries in the State of Wisconsin, upon which sites for thirteen dams had been selected and the Government lands required withdrawn from sale. Subsequent appropriations have been made for continuing work on the sources of the Mississippi in Minnesota, resulting in the completion of five dams and reservoirs, about completing the system in that state. As a consequence, good navigation is established from Brainerd to Grand Rapids, a distance of eighty-two miles, this being above Minneapolis, while the benefit to navigation below St Paul is of great value. Floods are restrained and water-powers benefited, although some dissatisfaction has been expressed by owners of water-powers relative to the management and operation of the works.

It is to be regretted that this great work has not been prosecuted as contemplated on the Wisconsin tributaries, which contribute to the Mississippi River a volume of water greater than that flowing in the main river at St. Paul. Provision had been made for beginning the work upon the Chippewa River in 1882, but was defeated for the reason that lumbermen and loggers declined to comply with the requirements of the Government to safeguard against claims for damage growing out of charters granted by the state for dams and other privileges. In consequence the river has since been at the sole service of lumbermen for log driving and storage, and its navigation for steamboats from its mouth to Eau Claire and Chippewa Falls, a distance of sixty miles, suspended—a use it had served from the earliest settlement of the Chippewa Valley.

Conditions are now radically changed. Log driving below Chippewa Falls has ceased, and the dams and reservoirs for flooding and driving logs are about to be abandoned. Conditions are now most favorable for the Government to begin the work abandoned in 1882, restore and improve navigation for steam-

Dam Site on Chippewa River, Wisconsin, at Brunett's Falls

boats and other craft, and yield to the Mississippi River the benefit of the regulated waterflow of this river. The lands withdrawn from sale hitherto, have been sold with reserved rights of flowage. The estimated cost of the works contemplated for and upon the Chippewa and branches, submitted by the Government engineer is $325,000.

The Chippewa River unites with the Mississippi at the foot of Lake Pepin, after a course of 267 miles, one of its sources extending to within twenty miles of Lake Superior, the total fall of the river being 900 feet. The drainage of the river commands an area of 9,573 square miles, occupied by countless springs, and more than 100 lakes, large and small, many of which may be utilized for reservoirs.

This vast area of 6,000,000 acres, much of which was once forests, embraces in most parts as fine agricultural lands as can be found anywhere, adapted to cereals, vegetables, fruits, and grasses. For dairying and stock raising they are not excelled. With the present population of 200,000, settlement is rapidly going forward.

The value of the water-powers upon the Chippewa River and tributaries cannot be measured. To undertake the enumeration and description of these varied water-powers would weary the reader or listener. It is worthy of note, however, that the east branch, the Flambeau, supplies a larger and more uniform flow of water than the main Chippewa, its drainage area being 2,120 square miles, and average discharge about 4,000 cubic feet per second. Of the numerous water-powers upon this branch the most available undeveloped power is located near Big Falls, four miles north of the Soo Railway, a fifty-foot fall being obtainable It may be truthfully stated that the territory embraced in the drainage of the Chippewa River may be made to sustain a population of 10,000,000 inhabitants. Similar conditions exist upon the St. Croix and Wisconsin rivers.

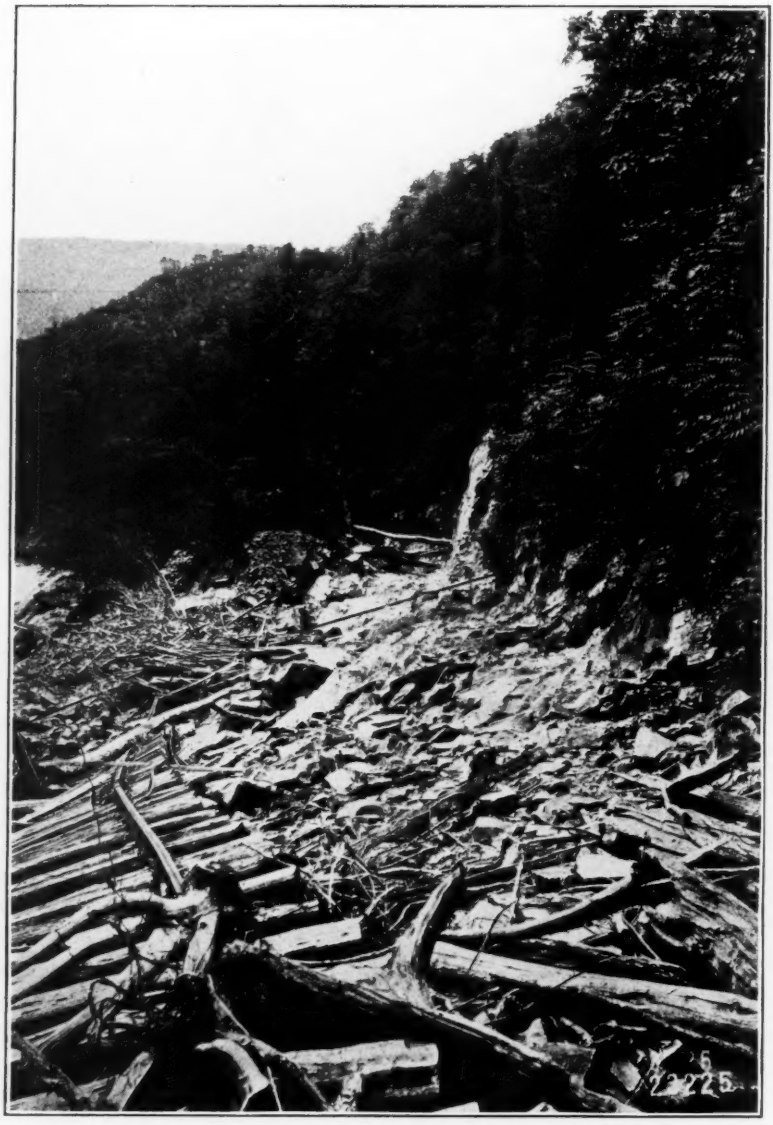
With the sources of the Missouri River wisely utilized by reservoirs, a six-foot channel in the Mississippi may be assured as far as Dubuque, where it would contribute to and be supplemented by the systems employed for improvement of navigation extending the entire length of the Mississippi to New Orleans.

Added to this great achievement would be prevention of disastrous floods and development of the water-powers, the value of which cannot be overstated.

View of Dam Site on Flambeau, Tributary of Chippewa River, Wisconsin, at Big Falls

SCENE IN KERN RIVER VALLEY

The Edison Electric Company Is Erecting a Power Plant in This Valley which Is Expected to Develop a Minimum of 50,000 Kilowatts



FLOOD DAMAGE IN THE SOUTH

Railroad Track Washed Away for over Half a Mile; Waters Piled Logs of Driftwood in the Cut Twelve Feet above the Grade on the Nolichucky River, Tennessee

SPECIMEN OF LONG-FEAF (YELLOW) PINE

Showing the Lower Part of the Trunk Damaged by a Forest Fire. The Upper Part, However, Is Making Vigorous Growth. Picture Taken near Ocilla, Georgia

IRRIGATION IN THE WEST

Fruit Farm near Grand Junction, Colorado, on the Line of the Denver and Rio Grande Railroad. Irrigated Peach Orchard, with a High Protecting Butte and Mesa at the Back

THE FOREST HOLOCAUST

How the Press of the Country Comments on the Recent Forest Fires—A Symposium on the Destruction of Our Standing Timber

RECENT issues of CONSERVATION have had much to say in regard to the wholesale destruction of forests and the appalling losses brought by fires throughout the entire country. Following is a symposium, gleaned from the columns of the daily press, on this subject. There is little to be added to the expressions herein contained; but, for the information of those of our readers who may have thought that CONSERVATION has been unduly exercised over the matter of losses by forest fires, we have taken the trouble to get together these extracts. They are enlightening, if for no other reason than that they show clearly the ever-widening sentiment in favor of safeguarding the forests; but, besides this, they show unmistakably that this magazine is not alone in recognizing the danger that threatens our timber supply.

FERTILITY OF SOIL BURNED OUT

In an article in the *Pioneer Press*, of St. Paul, Thomas Shaw recently called attention to the vast loss to agriculture caused by the series of forest fires that swept northern Minnesota and urged the need of better protection of the forests, as advocated by the American Civic Association. Mr. Shaw wrote:

"The real loss is far greater than any estimate shows, based upon the amount of timber consumed and the value of the property of the settler and the houses and improvements of villages and towns. The greatest loss, probably, is one that is never taken into account—the loss of young tress and the loss in humus.

"After one of these terrible conflagrations has swept over a timber slashing not a living thing of vegetation is left. Nature has to begin again the work for furnishing protection for the naked earth; years must elapse before the traces of the dreary desolation are hidden. The farmer who returns to rebuild his home upon the ashes is without material for building or fencing. and soon he is without material for living, except what he buys.

"But the loss of humus is a far greater loss. The vegetable matter so abundant on the surface of the soil in a new country is devoured by the flames. The top soil with all that it contains is turned into ashes. For two or three years good crops may follow because of the abundance of ashes lying over the soil, but the stimulating effect of these is soon lost. The area thus burned over will not recover what it lost by such a conflagration in a score of years, or in a period much longer."

NEED NATIONAL FIRE DEPARTMENT

There is a general demand for the establishment of a national fire department which, in a systematic and efficient way, shall keep guard over the forests. With losses aggregating tens of millions of dollars in the amount of lumber destroyed, with scores of persons burned to death, with hundreds made homeless and with all the serious damage to the soil, this is a grave question, but there ought be no hesitancy in getting to work.

"What this country needs is a national fire department," urges the *San Francisco Globe*. "Recent reports of

forest fires throughout the United States, and particularly in the West, where timber is most valuable, have been alarming, almost appalling.

"The actual destruction wrought can hardly be computed in figures, and the mental anxiety and physical suffering endured by thousands of persons in towns and villages touched by fire is incalculable by any human measurement. California has been one of the worst sufferers. Her famous trees narrowly escaped destruction and thousands of square miles of valuable timber land were burned. In Washington, Oregon, Nevada, Montana, Dakota, Minnesota—all through the Northwest—vast forest fires have raged.

"These things ought not to be. Yet, what is being done to prevent them? Nothing."

"What this government needs, and what the exigencies of the situation demand, is a fire department for the entire nation; a body of men trained and equipped to the last degree to fight the fires which are consuming the country's timber; a department provided with special trains and which can be transported from place to place upon the shortest notice, regardless of time and careless of expense. It would be costly, but look at the untold millions it would save yearly. A forest may be burned to the ground in a day, but it takes a hundred years to grow."

CANADA URGED TO PROTECT FORESTS

In urging Sir Wilfrid Laurier, the Canadian Premier, to advocate a policy for the preservation of the Dominion timber lands, the *Toronto World* declared in a recent editorial:

"For years the *World* has advocated the promulgation of a new and comprehensive forest policy upon advanced scientific lines, securing adequate protection of the growing timber from fires, the harvesting only of mature timber and the protection of the younger growth and the reforestation of the sections already denuded and unfitted for agricultural use.

"Experts all agree that the world is within measurable distance of a timber famine and the conditions in the United States particularly are causing grave anxiety to all public men who have given the question attentive consideration. Nor is it alone the result of the denudation of the old forest lands in creating a shortage in the supply which has to be faced.

"Denudation of mountain ranges and wooded areas has a very important bearing upon the character of the streams and rivers, and upon the climatic and soil conditions. When the ground is forest-covered the watercourses are not liable in the same degree to sudden changes in volume. Rivers rise and fall gradually and disastrous floods are much less likely to occur. Forests hold the water and help to feed the springs whose existence is so necessary in many parts of the country, and looking to a new and extraordinary value now associated with water powers, their maintenance at sufficient volume throughout the year, and from year to year, must become a question of increasing importance and urgency.

"The time has arrived for the dominion and the provinces of Canada possessing valuable forest lands to protect the present and future interests of the people in these assets and their responsible governments can find no better way of laying posterity under obligation."

PINCHOT'S WARNING

Calling attention to the warning sounded by Gifford Pinchot, chief of the United States Forest Service, the *Chicago Post* said recently:

"Forest fires in Wisconsin, Minnesota, and Michigan are destroying millions of dollars' worth of standing timber and are menacing a score of villages with destruction. The states individually, by adopting the government's system of protective patrols now in service in the Federal forest reserves, can prevent the repetition of the disasters of the present year.

"Gifford Pinchot, the government's chief forester, said, less than six months

ago, that at the present rate of consumption of timber the end of the American forests as sources of supply of good material would come in twenty years. The warning was based on a study of conditions in every part of the United States. The fires that have been in progress since the present period of drought began have been the most damaging in a quarter of a century.

"If adequate protective measures are not taken the limit of twenty years' life set for the woodlands will be cut in half. If prompt action is taken, even in view of the great losses of the year, the forests may be preserved for all time."

WHAT FOREST FIRES SIGNIFY

"If the people of Minnesota and neighboring states had taken in earnest all that has been said of late about conserving our natural resources, they would have done something to prevent these calamitous forest fires or to make them less destructive. Probably if an attempt had been made to obtain an appropriation from the Minnesota legislature for a sufficient number of men to patrol the forests during the more dangerous part of the year, it would have met with failure—have been called a useless and extravagant expenditure.

"But a comparatively small outlay would have cut down to insignificant figures a fire-loss which is in the millions. Wisconsin had one great forest fire more than thirty years ago; if it were to have another, the fault would rest with a state government which failed to adopt preventive measures."—*The Chicago Tribune.*

PREVENTION OF FOREST FIRES

"The prevention of forest fires is really the most strenuous problem that confronts the department of the government concerned about increasing the forests of the United States. It will take a great deal of replanting every year to overcome the ravages which are worked by these fires. In a night a forest fire may burn up more wood than would supply half a state with lumber.

"One who has not traversed the vast pine forests can't realize what are the dangers that constantly menace such forests, especially in the belts where summer droughts are long protracted and severe. There is always a lot of deadwood and dried grasses in which the sparks from locomotives and the fagots from the careless campers find lodgment and start great conflagrations. The railroad companies seemingly take every precaution. They plough furrows and they burn over strips on which sparks are apt to fall, but all these precautions often go for naught. One way in which the dangers from railroad locomotives might be overcome is by the use of oil for fuel instead of coal. Oil as fuel means that no sparks are scattered over the country. Many railroads now use a very soft coal and sparks and cinders are thrown out in vast quantities. There ought to be some way of preventing such dangers."—*The Republican,* Cedar Rapids, Iowa.

FORESTRY AS AN INSURANCE

"Forest fires in the Mesaba range, Minnesota, which wiped out the town of Chisholm and destroyed more than $5,000,000 worth of property, were fed largely by the tangle of deadwood and brush which had accumulated in years of forest neglect. The intensity of the average forest fire is due to similar conditions. Improved forestry prevents such timber heaps. It costs money for labor to clear the woods of brush and to remove fallen trees and deadwood, but such work does something more than save all the living powers of the soil for the growing trees. It prevents the accumulation of fuel with which to feed sweeping flames. Is it not worth while? The value of forestry as an insurance against fire loss is capable of mathematical demonstration."—*The Boston Herald.*

PUNISHMENT FOR CARELESS PERSONS

"One of the things that the state should not neglect in the next session of the legislature is the passage of laws for the safeguarding of the forests so that they can be protected from fires, and so that men who ruthlessly and intentionally set fire to such forests can be sufficiently punished.

"It appears to be an accepted fact that these fires are the result of carelessness, or spite, or ignited by men who hope to make money by fighting them. All of these causes are sufficient to invite attention and severe punishment. It is a subject that the state must handle with a strong hand."—*The Republican,* Scranton, Pa.

LOSS NOT ONLY UPON FOREST COMMUNITIES

"It takes one hundred to four hundred years to grow such trees as have made up the great forests of Michigan, which have disappeared in large measure; but they can be destroyed in a day. It is estimated that the great fires which have swept over the remaining forests of portions of the State in the last twenty days have destroyed $40,000,000 worth of timber. As we have reached the point where the cost of lumber must be measured by the cost of replacing the forests with new growth, it will be appreciated that this loss does not fall upon Michigan alone."—*Rockford* (Ill.) *Gazette.*

LOSSES ARE IRREPARABLE

"This is bad news from Maine which tells of great fires in the forests. The meaning will be better understood when it is remembered that the great Maine woods constitute the only reserve of timber of any real consequence in this part of the country. Every inroad upon it is irreparable, so far as the present generation is concerned. The case is bad enough when the ax and saw are wielded recklessly, but at least we have the use of the timber. Fire simply destroys; the great tracts burned over are a total loss."—*The Providence Bulletin.*

CANNOT AFFORD FOREST FIRES

"Aside from the enormous amount of property destroyed by forest fires, we cannot afford to have such inroads upon the timberlands. We need all the woodland we have, and more. Some means will have to be devised to stop this fearful and needless waste."—*The Schenectady* (N. Y.) *Gazette.*

LESSON FOR STATESMEN

"The need for forestry patrol is being greatly emphasized by the fires that are devastating the timber lands. Those eminent statesmen who voted against the President's measures probably now realize how little wisdom and how much selfishness there was in their course."—*The Omaha Bee.*

HOW MICHIGAN VIEWS ITS LOSSES

"Millions of dollars' worth of timber has been destroyed in the forest fires and the damage in 1908 represents a great deal more in dollars and cents than did the memorable conflagrations in 1871, because lumber is much dearer now than then. In 1871 practically the only merchantable timber was pine; the era of the hardwoods had not arrived. Now the forest fires inflict heavy pecuniary damage when they sweep off acres of maple and oak as well as pine."—*Saginaw* (Mich.) *News.*

REPLANTING WILL COST A FORTUNE

"Estimates of the losses caused by forest fires in the territory of the northern boundary have been placed at $40,000,000 by Prof. Filibert Roth, of the Forestry Department of the University of Michigan, who has returned from a visit to the burned regions. He said that more than a million acres of good timber lands have been devastated. It will cost $5 an acre to replant this land."—*Detroit Free Press.*

NEWS AND NOTES

Forest Service Personnel in Six New Field Districts

THE names of the 377 foresters, clerks, and stenographers who are to make up the personnel of the United States Forest Service Headquarters of the six districts into which the National Forests have been divided, have just been announced. The district foresters' offices, located in Denver, Colo.; Ogden, Utah; Missoula, Mont.; Albuquerque, N. Mex.; San Francisco, Cal., and Portland, Oreg., will open on December 1.

The new field organization of the Forest Service will greatly facilitate the use of the National Forests by the people. It will mean that the National Forest business which formerly was transacted in Washington will be handled by officers on or near the ground. The establishment of the district headquarters is the culmination of a plan toward which the Forest Service has been working steadily since it took charge of the National Forests.

Each National Forest District will be in charge of a District Forester. The work at district headquarters will be distributed among four offices—Operation, Grazing, Silviculture, and Products—each equipped with men of special training for the work of their office.

The Office of Operation will be charged with responsibility for the protection of National Forests, for the building of roads, trails, and other permanent improvements upon them, for the organization of the force on National Forests, and with the supervision of all business relating to the special use of National Forest resources. The Office of Silviculture will have supervision of the free use and sale of timber from National Forests, forest planting upon them, and will conduct forest studies on National Forests as well as in cooperation with private owners in the District. The Office of Grazing will supervise grazing business in the District, except for the actual fixing of allowances, periods, and rates, and will make studies looking to the improvement of the forage crop on National Forests. The Office of Products will make both independently and in cooperation with private owners, studies leading to a more profitable use of timber on and off National Forests within the District and to their preservative treatment.

From the District Foresters down, the personnel of the District offices is made up of men picked for their proved capacity, for their thorough training, and for their experience in the West. Most of them are men who not only have worked in the West after they entered in the Service, but who lived in the West before they took up the Government forest work. Many of them are men who formerly were employed on the National Forests and have been promoted to larger responsibilities as a result of their high efficiency. The personnel of the District offices, which has just been announced, is as follows:

District One Including: Montana, Northeastern Washington, Northern Idaho, Northern Wyoming, and Northwestern South Dakota. *Headquarters*: *Missoula, Mont. W. B. Greeley, District Forester;* F. A. Silcox, Assistant District Forester.

R. H. Rutledge, Chief, Office of Operation; R. Y. Stuart, Assistant Chief; J. P. Martin, Chief Engineer; E. W. Kramer and T. L. Day, Engineers; E. B. Quiggle, Chief, Section of Occupancy; P. J. O'Brien, Claims Clerk; J. E. Keach, Settlement Clerk; C. O. Wilhite, Uses Clerk; H. I. Loving, Fiscal Agent; O. M. Wold, J. A.

Urbanowicz, Miss Grace M. Curtin, and P. S. Gray, Accounts Clerks; R. L. Campbell, Chief, Section of Maintenance; Miss Belle G. Warren, Miss Lydia Jacobi, Miss J. L. Farnsworth, Clerks; Gordon Guptill, H. F. Tripp and Mrs. L. H. Bryan, Draftsmen.

C. H. Adams, Chief, Office of Grazing; W. S. Perrine, Assistant Chief; Miss B. Todd, Clerk.

W. R. Wheaton, Chief, Office of Products; F. I. Rockwell, Assistant Chief; Miss Eva Slocum, Computing Clerk.

A. W. Cooper, Chief, Office of Silviculture; D. T. Mason, Assistant Chief; E. I. Terry, Chief, Section of Silvics; W. T. Stone, Assistant; E. O. Clifford, Chief, Section of Planting; W. M. Aiken, Law Officer; S. J. Humeston, Assistant Law Officer; J. F. Preston, J. D. Warner, J. A. Fitzwater, G. B. MacDonald, K. W. Woodward, W. B. Piper, L. S. Murphy, J. St. J. Benedict, E. D. Fletcher, and P. R. Hicks, Forest Assistants; F. X. Salzman, A. J. Norton, and W. T. Cott, Lumbermen; C. W. Gleason, R. P. McLaughlin, J. W. Streit, and J. D. Jones, Land Examiners; C. B. Swim, Assistant Land Examiner; H. M. Booth, C. A. McElroy, and C. J. Sullivan, Expert Miners.

The following have been assigned to the stenographic work in this district: Misses F. L. Sinclair, E. M. Linell, Florence Kelly, Bessie C. Shimman, B. M. Gray, H. E. Kearney, Eva Ammen, Mathilde Ammen, Mrs. L. K. Locke, Floy K. Riley, Otto Greenwald, and C. E. Gage.

District Two Including: Colorado, Southern Wyoming, South Dakota, Northwestern Minnesota, Nebraska, Western Kansas, and Southeastern Utah. *Headquarters*: *Denver, Colo*: *Smith Riley, District Forester;* P. G. Redington, Assistant District Forester.

Fred W. Morrell, Chief, Office of Operation; C. J. Stahl, Assistant Chief; R. E. Mesnard, Chief Engineer; Nile Hughel, Engineer; Fred Lees, Chief, Section of Occupancy; C. F. Folloh, Claims Clerk; Mrs. Anna L. Riordan, Settlement Clerk; G. W. Holland, Uses Clerk; W. R. Fuchs, Fiscal Agent; F. C. Thompson, W. A. McKenzie, Miss Alva von der Linde, and W. C. Stump, Accounts Clerks; J. W. Dilly, Chief, Section of Maintenance; Miss Gertrude L. Kimmel, File Clerk; Mrs. Rosa C. Pennebaker, Assistant File Clerk; Miss Nettie M. Kimmel, Mail Clerk; C. B. Gosorn, C. B. Noyes, I. I. Tayloe, and Mrs. Stella W. Munce, Draftsmen.

J. W. Nelson, Chief, Office of Grazing; E. N. Kavanaugh, Assistant Chief; Miss Anna P. Koschwitz, Clerk.

C. L. Hill, Chief, Office of Products; G. R. Ogier, Assistant Chief; W. L. Stockton, Computing Clerk.

A. K. Chittenden, Chief, Office of Silviculture; S. L. Moore, Assistant Chief; C. G. Bates, Chief, Section of Silvics; W. D. Edmonston, Assistant; L. C. Miller, Chief, Section of Planting; G. S. Arnold, Law Officer; J. M. Cates, Assistant Law Officer; J. Bentley, Jr., R. W. Allen, G. P. Bard, R. G. Pierce, H. B. Holroyd, A. L. Heim, T. Lyons, and J. A. Silsbee, Forest Assistants; W. R. Davey, and H. S. Bushnell, Land Examiners; G. H. Gustafson, H. Gregory, Wm. Darley, and F. W. Blatt, Assistant Land Examiners; George P. Gregg, W. R. McKinnon, and J. S. Baird, Lumbermen; T. A. Curry and F. Sherwin, Jr., Expert Miners.

The following have been assigned to the stenographic work in this district: Misses Ethel M. White, Hilda Rosenquist, Stella Hooper, P. Womack, Lura M. Holcomb, Cary L. Hendricks, Sue Hayward, May Wise, Ermina E. Weaver, Anna Mellan, Eva L. Gay, Lillian E. Wessler, Mabel Berry, Hattie Felder, Lena A. Daniels, and Marguerite T. Waters.

District Three Including: Arizona, Arkansas, New Mexico, and Oklahoma. *Headquarters*: *Albuquergue, N. Mex. A. C. Ringland, District Forester;* E. H. Clapp, Assistant District Forester.

A. C. Waha, Chief, Office of Operation; R. G. Willson, Assistant Chief; E. H. Jones, Chief Engineer; H. H. Harris, Chief, Section of Occupancy; Oliver C. Phillips, Claims Clerk; Miss K. M. Riley and G. Griffin, Settlement

Clerks; W. D. Wheeler, Uses Clerk; J. J. Duffy, Fiscal Agent; William Rose, A. Morris, Miss M. L. Hobgood, and Mrs. E. V. Steely, Accounts Clerks; W. B. Bunton, Chief, Section of Maintenance; Miss Mary Latimer, File Clerk; Miss Cornelia Glase, Assistant File Clerk; Mrs. Ruth Harris, Mail Clerk; E. R. Thompson, Chas. H. Freyer, and Miss Helen B. Smith, Draftsmen.

J. K. Campbell, Chief, Office of Grazing; John Kerr, Assistant Chief; Miss Zuleika Felder, Clerk.

O. T. Swan, Chief, Office of Products; Miss M. A. Bell, Computing Clerk.

T. S. Woolsey, Chief, Office of Silviculture; A. B. Rechnagel, Assistant Chief; W. R. Mattoon, Chief, Section of Silvics; G. A. Pearson, Assistant; A. S. Peck, Chief, Section of Planting; H. B. Jamison, Law Officer; I. F. Eldridge, J. H. Allison, R. L. Rogers, S. G. Smith, and D. N. Rodgers, Forest Assistants; D. W. Adams, and A. L. Wynne, Lumbermen; J. V. Hubbard and Lee A. Harris, Land Examiners; E. H. Corlett, Jr., H. Greene, G. H. Kellogg, and Morton K. McGillan, Assistant Land Exaniners; S. L. Gillen and H. N. Johnson, Expert Miners.

The following have been assigned to the stenographic work in this district: Claudius J. Neis, Luther Steward, James T. Markey, and Mrs. B. S. Asquith, Misses Florence Derbyshire, Mary Miller, M. E. Baker, Lilie A. Cheshire, M. A. Shekells.

District Four Including: Utah, Southern Idaho, Western Wyoming, Eastern Nevada, and Northwestern Arizona. *Headquarters*: *Ogden, Utah. Clyde Leavitt, District Forester;* Franklin W. Reed, Assistant District Forester.

R. P. Imes, Chief, Office of Operation; E. H. Clarke, Assistant Chief; A. T. Mitchelson, Chief Engineer; A. L. Herring, Engineer; Timothy C. Hoyt, Chief, Section of Occupancy; Miss N. Huff, Claims Clerk; Miss M. M. Childs, Settlement Clerk; C. S. Brothers, Uses Clerk; Q. R. Craft Fiscal Agent; M. J. O'Toole, J. W. Cook, H. A. Seip, and Mrs. S. G. Totten, Accounts Clerks; R. E. Connor, Chief, Section of Maintenance; Miss Lillian McDevitt, File Clerk; Mrs. C. J. Kemon, Assistant File Clerk; Miss H. R. Patterson, Mail Clerk; A. G. Sorensen, Miss H. J. Holberg, and Miss A. R. Holberg, Draftsmen.

Homer E. Fenn, Chief of Office of Grazing; A. C. McCain, Assistant Chief; Mrs. J. B. Burnham, and Mrs. M. L. Ring, Clerks.

A. L. Brower, Chief Officer of Products; W. H. Murdock, Computing Clerk.

L. L. White, Chief, Office of Silviculture; O. M. Butler, Assistant Chief; E. R. Hodson, Chief, Section of Silvics; F. T. McLean, Assistant; J. M. Fotherolf, Chief, Section of Planting; W. C. Henderson, Law Officer; C. E. Dunstan, D. C. A. Galarneau, C. P. Wilbur, and L. Crowell, Forest Assistants; D. W. Seery, and D. M. Lang, Lumbermen; W. W. Blakeslee, and G. C. Thompson, Land Examiners; R. Dieffenbach and William Winter, Assistant Land Examiners; B. L. Wheeler, Expert Miner.

The following have been assigned to the stenographic work in this district: V. C. Metcalf, and Misses Anna M. Dow, Judith Fant, H. V. Rittue, Pattie Sanderlin, Ruth Helff, Grace Griswold, Mary E. Moore, Rozelle Lazenby, and Veronica Tegethoff.

District Five Including: California and Southwestern Nevada. *Headquarters*: *San Francisco, Cal. F. E. Olmsted, District Forester*; Coert Dubois, Assistant Forester.

R. L. Fromme, Chief, Office of Operation; Roy Headley, Assistant Chief; F. C. Wales, Chief Engineer; W. C. Nespital and E. E. Leslie, Engineers; B. Franklin, Chief, Section of Occupancy; W. F. Gardner, Claims Clerk; Miss E. L. MacFate, Settlement Clerk; B. P. Berger, Uses Clerk; J. S. Swan, Fiscal Agent; Miss Celestine Igoe, Miss E. M. Rea, H. J. Weil, and C. Wiley, Accounts Clerks; A. L. Dahl, Chief, Section of Maintenance; Mrs. V. M. Bain, File Clerk; Miss Mary McDonald, Assistant File Clerk; Miss

Martha Sexton, Mail Clerk; R. E. L. Borgfeldt, J. G. Shumate, Miss E. L. De Valin, and Miss Daisy E. Walker, Draftsmen.

J. H. Hatton, Chief, Office of Grazing; M. B. Elliott, Assistant Chief; Miss Lula E. Haukness, Clerk.

L. E. Hunt, Chief Office of Products; C. S. Smith, Assistant Chief; Miss Carrie T. Montrose, Computing Clerk.

G. M. Homans, Chief, Office of Silviculture; T. D. Woodbury, Assistant Chief; T. R. Cooper, Chief, Section of Silvics; J. H. Foster, Assistant; G. W. Peavy, Chief, Section of Planting; E. A. Lane, Law Officer; T. M. Talbot, Assistant Law Officer; P. T. Harris, Swift Berry, Louis Margolin, Carl A. Kupfer, V. Wulff, G. R. Gessert, and W. D. Dudding, Forest Assistants; S. M. Cross, John L. Lafon, Jr., and J. C. Elliott, Lumbermen; G. L. Duncan and E. C. Hard, Expert Miners.

The following have been assigned to the stenographic work in this district: H. G. Allen, Mrs. Ruth Lyle, and Misses Mary O'Toole, Marjorie Webster, Cora Slicer, Claudine McClinton, F. Keen, M. E. Sherman, Marie Smith, Violet Kidwell, L. M. Jarvis, Annie K. Gardner, Minnie B. Aarons, Bertha M. Brown, and Ella M. Hildreth.

District Six Including: Washington, Oregon, a small portion of Northern California and Alaska. *Headquarters: Portland, Oreg. E. T. Allen, District Forester;* G. E. Cecil, Assistant District Forester.

C. H. Flory, Chief, Office of Operation; C. J. Buck, Assistant Chief; W. E. Herring, Chief Engineer W. H. Benton and E. H. Darling, Engineers; W. F. Staley, Chief, Section of Occupancy; D. F. McGowan, Claims Clerk; T. M. Moorman, Settlement Clerk; Frank A. Law, Jr., Uses Clerk; A. H. Cousins, Fiscal Agent; Miss Florence D. Strause, C. C. Brunner, Miss Lucy I. Brader, and Miss Augusta W. Russell, Accounts Clerks; Shirley Buck, Chief, Section of Maintenance; Miss E. J. Bernhardt, File Clerk; Mrs. A. P. Mulford, Assistant File Clerk; Mrs. L. G. Riddell, Mail Clerk; O. E. Haring R. H. Robertson, G. Hilton and Miss L. W. Cottrell, Draftsmen; Howard K. O'Brien, Chief, Office of Grazing; T. P. McKenzie, Assistant Chief; Mrs. M. L. Joynt, Clerk.

J. B. Knapp, Chief, Office of Products; H. B. Oakleaf, Assistant Chief; Miss Erma F. Bell, Computing Clerk.

F. E. Ames, Chief, Office of Silviculture; C. S. Judd, Assistant Chief; T. T. Munger, Chief, Section of Silvics; J. F. Kummel, Chief, Section of Planting; C. H. Pierce, Law Officer; G. E. Frowbridge, Assistant Law Officer; N. F. McDuff, Dorr Skeels, Max Rothkugel, P. S. Buhl, O. P. M. Goss, and E. B. Starr, Forest Assistants; Wm. T. Andrews and J. P. Hughes, Lumbermen; C. L. Farrar and A. L. Thayer, Land Examiners; W. McBride and T. O. Erickson, Assistant Land Examiners; J. G. Giddings and H. S. Riggins, Expert Miners.

The following have been assigned to the stenographic work in this district: Misses Pearl Shrader, Anna Madsen, Dora Reese, Agnes McNair, Elizabeth Garth, Beulah Westlake, Louise Helmick, K. L. Reed, Clara Gonter, Agnes V. Scannell, Ida Estes, Mrs. M. F. Rule, Florence Wilson, and Mrs. J. R. Anderson.

❦ ❦ ❦

Association Changes Name

AT THE convention of the Gulf Coast Inland Waterway Association held last month in Columbus, Ga., the name of the association was changed to The Mississippi Atlantic Inland Waterway Association. Duncan W. Fletcher, of Jacksonville, Fla., was elected president.

❦ ❦ ❦

American Mining Congress

ON DECEMBER 2, 3, 4, and 5 the American Mining Congress will hold its annual meeting, at which will be gathered together the foremost men in all branches of the mining industry not only in the United States, but

throughout the world. The meeting this year will be held in Pittsburg, and among the subjects to be discussed is that of forest preservation, which, the invitation states, is held to be intimately related with mining. The invitations summed up the purport of the Congress thus:

"The main purpose of the Convention is to bring out the opinions and suggestions of all men interested in mining upon such matters as need consideration, in order to arrive at a remedy for any improper condition."

The American Mining Congress has already taken some long steps forward in the matter of forest protection, and it is believed that the deliberations of the Congress at this year's sessions will have an important bearing upon the subject of forest conservation; at least, in so far as it relates to the permanent timber supply for mine uses.

❦ ❦ ❦

Illinois Votes for Waterway

AT THE National Election on November 3 the people of Illinois voted on the proposition to bond the state for $20,000,000 for the purpose of constructing a deep-water channel from Lockport, Ill., to Utica, Ill., on the Illinois River. This channel, when completed, is to be a part of the ship canal from the Great Lakes to the Gulf, running through the Chicago River, the Drainage Canal, and the Illinois River to the Mississippi. The proposition to bond the state for $20,000,000 was carried by a decisive majority, and, so far as the people of the state are concerned, the final word has been said and the canal is authorized.

❦ ❦ ❦

Forest Receipts in Western Depositories

BEGINNING December 1, receipts from the six field districts into which the National Forests have been divided will be deposited in Western banks, and the Government has selected the six depositories which are to handle the funds taken in at headquarters of the several new districts. The object of this move, it is announced, is to keep the National Forest receipts in the region in which they originate; the funds will be deposited to the credit of the Treasurer of the United States, but will be available for circulation in the sections from which they are derived. All moneys received from timber sales, permits for stock grazing and for special uses of the various natural resources in the National Forests will be handled in this manner. The depositories chosen, by districts, are: First District, including Northeastern Washington, Northern Idaho, Northern Wyoming, and Northwestern South Dakota, the Western National Bank, Missoula, Mont.

Second District, including Colorado, Southern Wyoming, South Dakota, Northwestern Minnesota, Nebraska, Western Kansas, Southeastern Utah, the Denver National Bank, Denver, Colo.

Third District, including Arizona, Arkansas, New Mexico, and Oklahoma, the First National Bank, Albuquerque, N. Mex.

Fourth District, including Utah, Southern Idaho, Western Wyoming, Eastern Nevada, and Northwestern Arizona, the First National Bank, Ogden, Utah.

Fifth District, including California and Southwestern Nevada, the First National Bank, San Francisco, Cal.

Sixth District, including Washington, Oregon, and small part of Northern California and Alaska, the First National Bank, Portland Oreg.

The estimated receipts from National Forests for the present fiscal year will approximate $2,000,000, making the estimated receipts from the six field districts from $275,000 to $350,000, and this money, instead of being sent direct to Washington, as in the past, will remain in the country in which it originates, ready for the demands of local circulation.

Arboretum for Cornell University

THROUGH the generosity of an alumnus, Mr. Henry Hicks, of Westbury, L. I., a member of the class of '92, Cornell University, Ithaca, N. Y., is to have an extensive and comprehensive arboretum. The site has already been chosen, and the arboretum will be located in what is known as Cascadilla Ravine, near the university grounds. About twenty acres will be devoted to trees, which will be furnished by Mr. Hicks, and the collection, it is announced, will embrace specimens of practically the entire forest growth of the temperate zone. Mr. Hicks will include in the collection a large number of trees native to Japan and Manchuria, and the arboretum will, therefore, be somewhat in the nature of a testing ground for forest specimens that are comparatively little known in this country. It is announced that planting will be started early next spring.

❦ ❦ ❦

Resolutions by Carriage Builders' Association

THE following resolution was adopted by The Carriage Builders' National Association of the United States at its Thirty-sixth Annual Meeting at Chicago, October 13-15, 1908.

"The progressive failure of our timber supply, intensified by recent forest conflagrations, the intimate connection between forests on the one hand, and flood prevention, soil conservation, inland waterway and water-power development, with irrigation of arid and drainage and swamp lands on the other, make the question of forest conservation an issue of gravest national import. Success in administration of our national forests contracts in striking manner with failure in the administration of most of our private forests. Experience, home and foreign, proves that intelligent expenditure on forestry is a remunerative investment. The Governors' Conference, the unanimity of the press and the rising tide of approving public sentiment bear increasing testimony to the popular demand for forest conservation. The Appalachian-White Mountain Bill, again passed by the United States Senate at its last session, represents the next step in practical forestry. The Carriage Builders' National Association of the United States, in its Thirty-sixth Annual Meeting assembled, therefore earnestly urges the House of Representatives of the United States certainly and speedily to enact this measure into law at the coming session of Congress."

❦ ❦ ❦

State Revenue from National Forest Increased

IN ADDITION to the benefits secured by fire protection and by regulations which control the use of timberland and range so as to insure permanent supplies for local wants, the states having National Forests now receive, under the new Agricultural Appropriation Bill, twenty-five per cent. of the gross proceeds derived from the sale of National Forest resources. This amount, according to law, goes to offset any losses to the states through withdrawal of forest areas from taxation, and is devoted to public roads and schools.

Several years ago complaints were made that the withdrawal of timberlands for forest purposes reduced the taxable areas of the states in which withdrawals were made. The Forest Service, quick to see the justice of these complaints, recommended at first that ten per cent. and later that twenty-five per cent. of the gross proceeds from the National Forests should be paid to the states. As a result, the states are assured of school and road funds, doubtless more certainly than they otherwise could have been, since the permanence of the Forest resources is now secured by conservative management. Had the Forests never been established, their resources would undoubtedly have been exhausted by hasty and improvident methods of exploitation, leaving the land wasted and unproductive.